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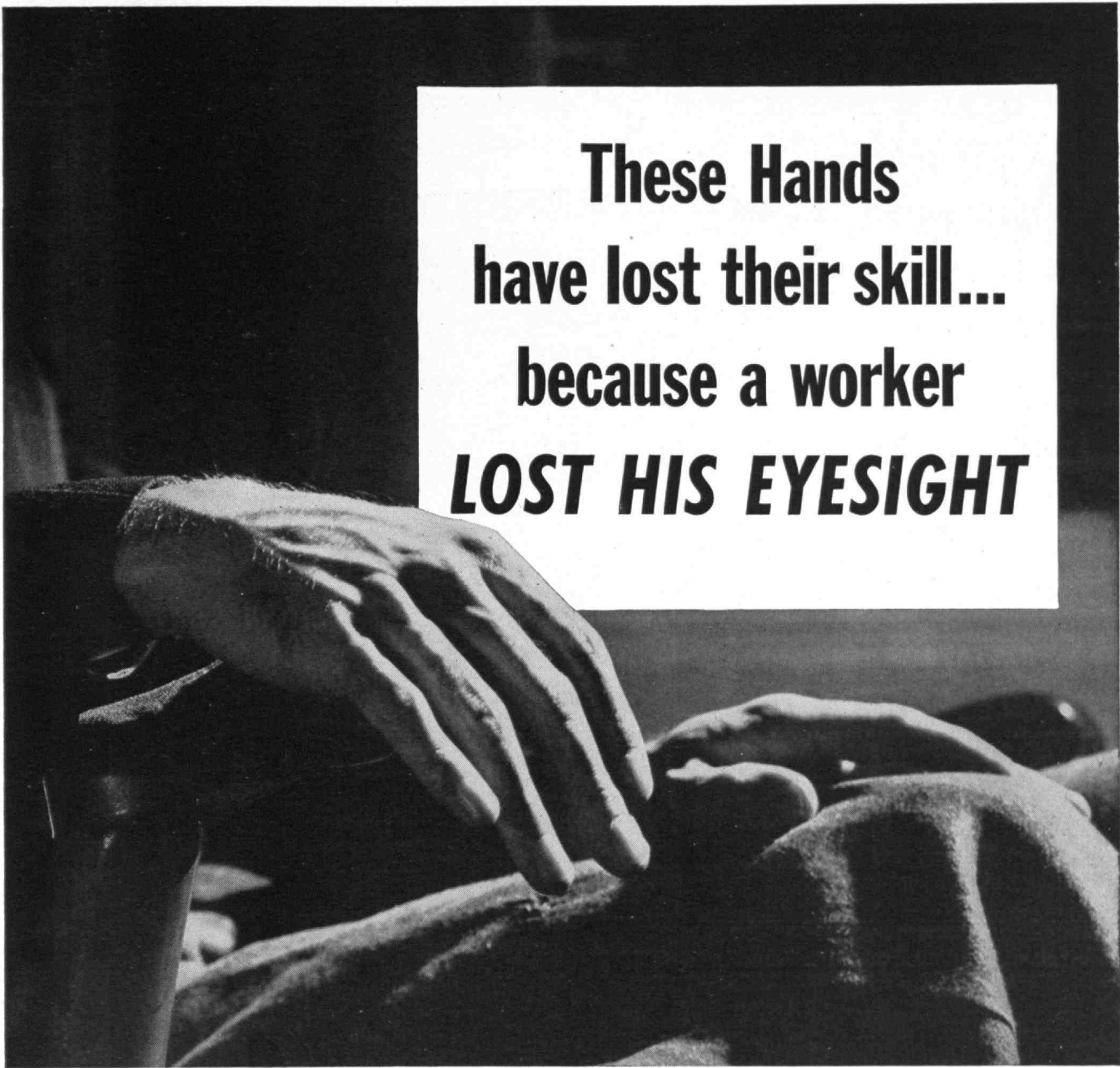


Foreman: "They asked me if the grinding department could possibly turn out more of certain parts with present equipment. I began experimenting. I changed the wheel combination from the old standard and it worked! We cut down grinding wheel costs and got more pieces per hour. So if you can't get more grinding machines, try some wheel experiments. Try telephoning a Norton engineer for a tip."



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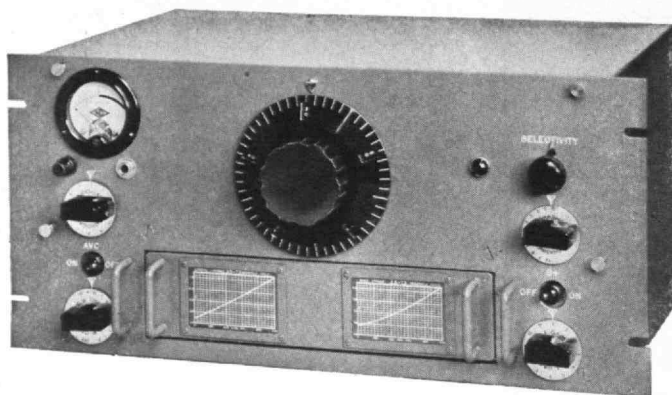
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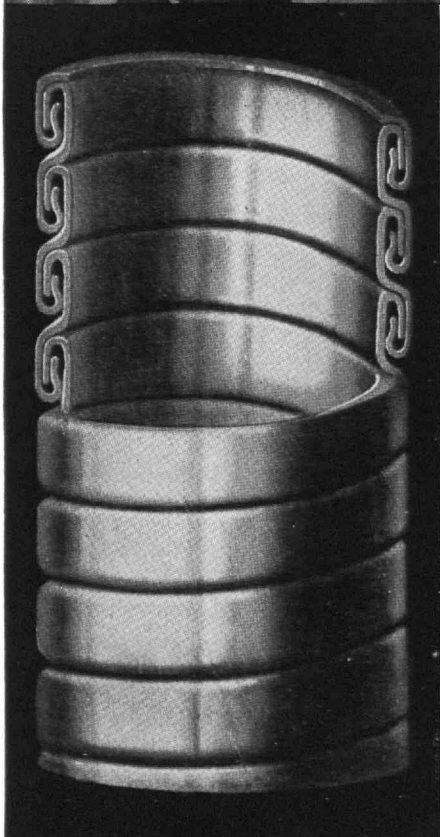
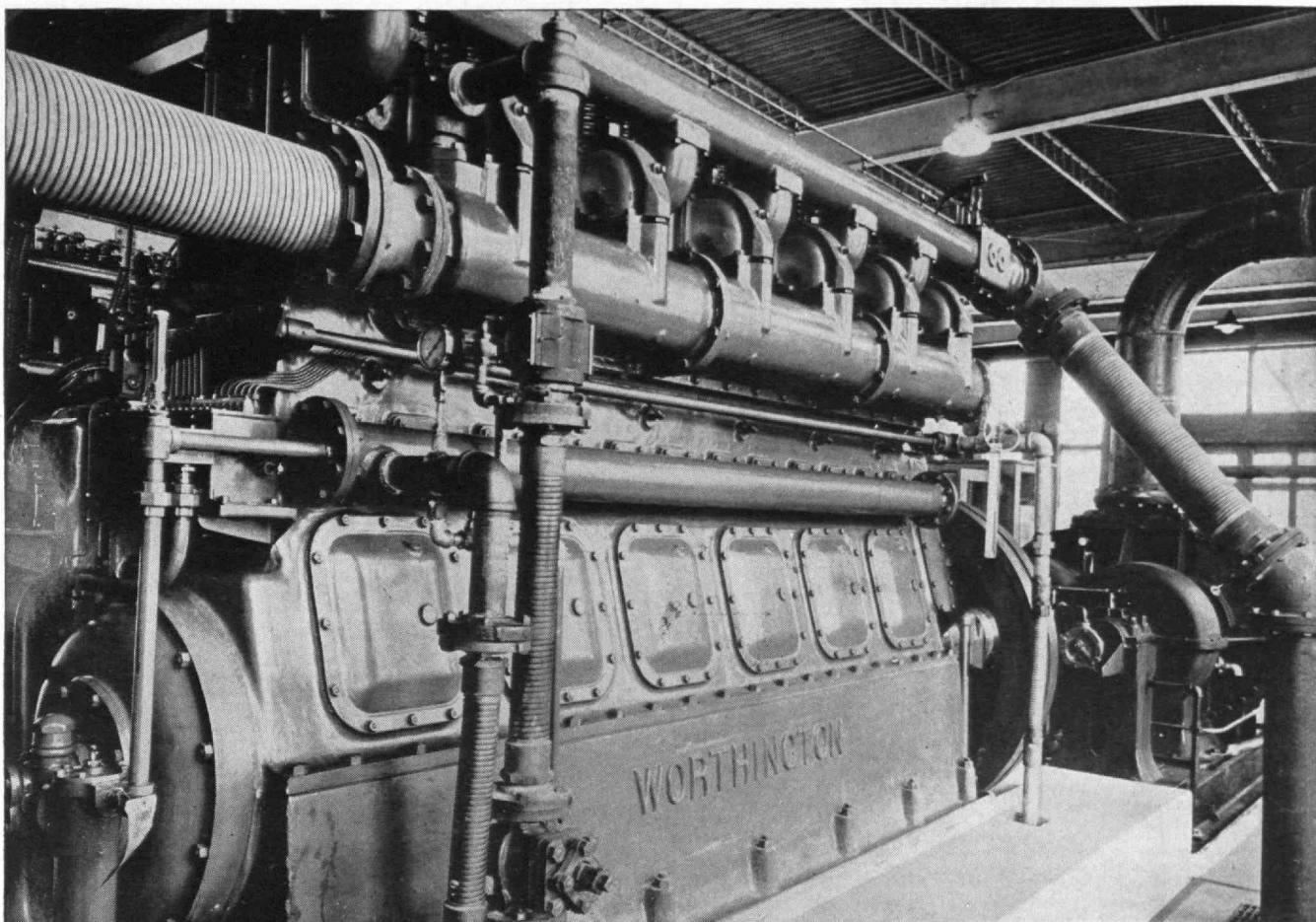
IF THIS WERE AN OFFICIAL ARMY OR NAVY PHOTOGRAPH . . .

it would be on the restricted list, with publication prohibited. Actually it is from the National Catalogue published before the war. Yet basically the receiver is the same. True, it is now built to government specifications rather than the amateurs'. There are new refinements that we cannot even tell you about, but which make it a better receiver than the one you have known. But basically it is still the same receiver.

When you turn to it after the war as to an old friend, you will find that it looks different, performs better and handles more easily. Yet you will find that it is still designed and built in the tradition that made a receiver engineered for peace meet the rigorous demands of war.

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... Armored for Safety

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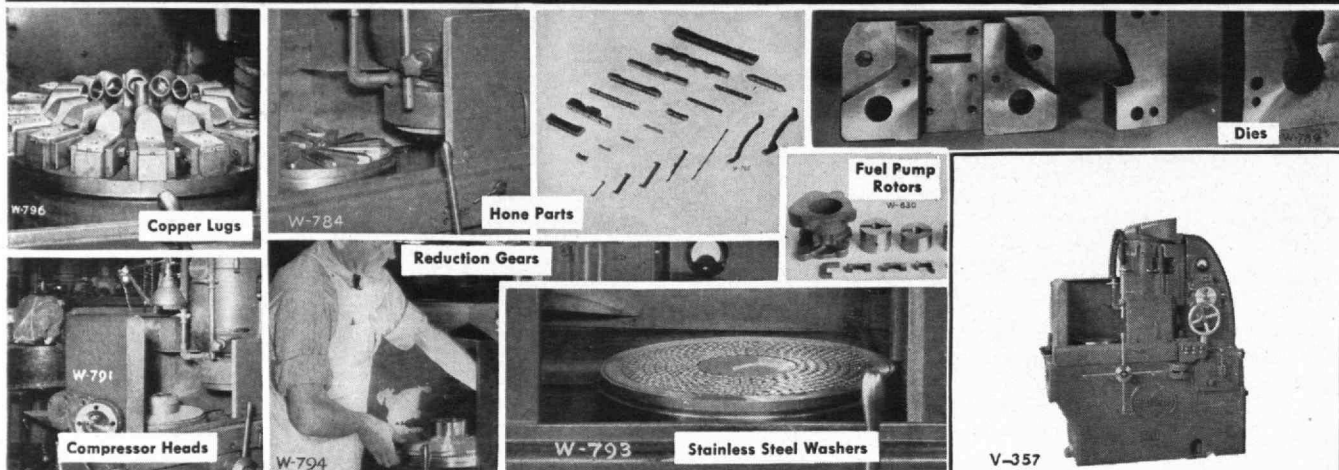


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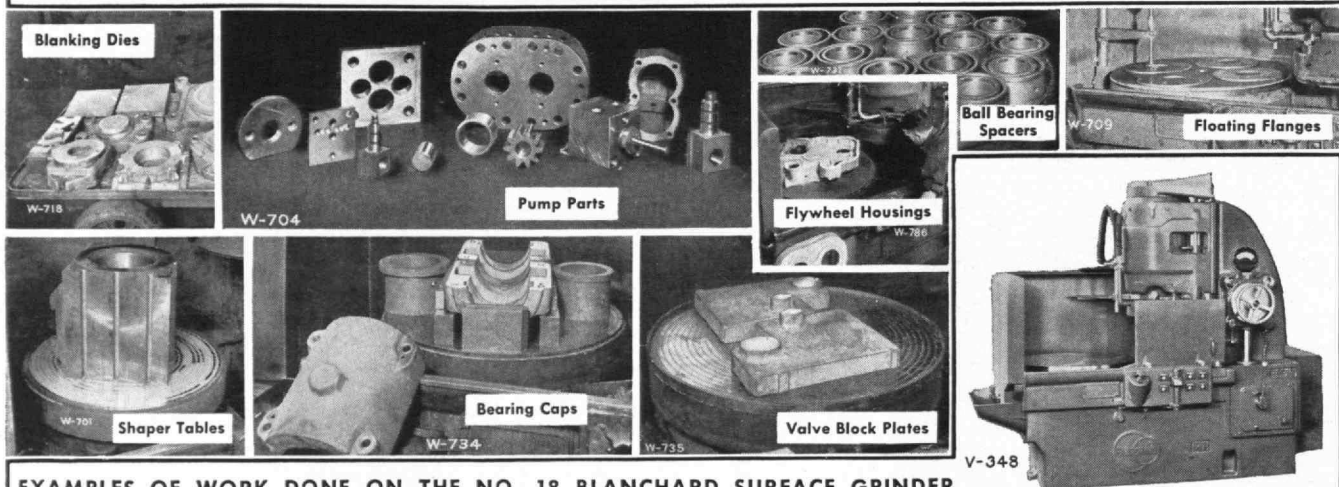
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ESTABLISHED 1902

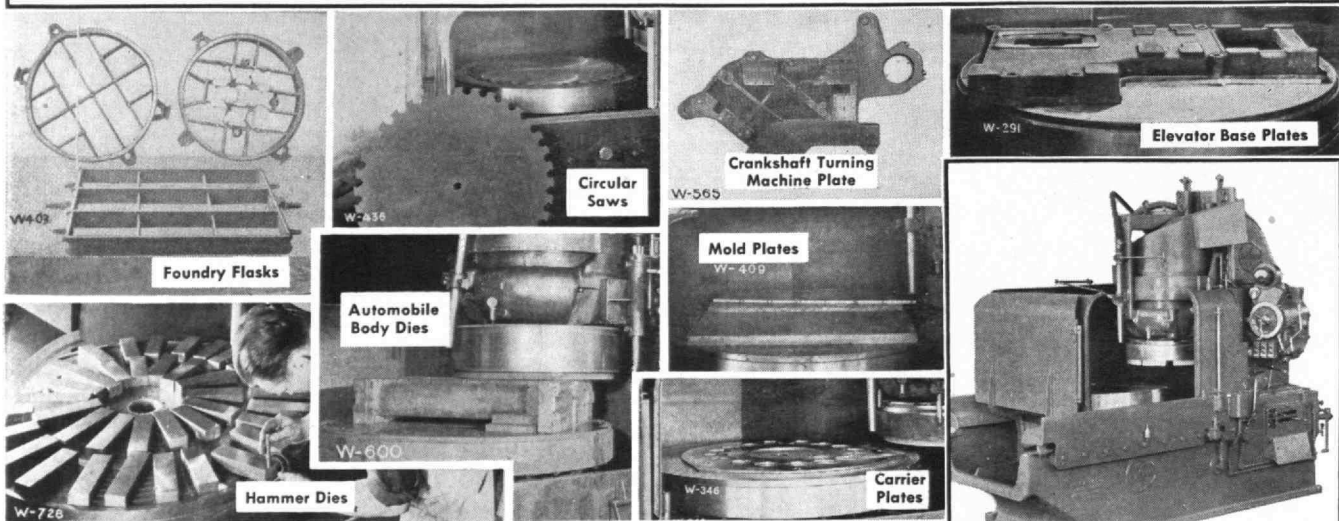
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EXAMPLES OF WORK DONE ON THE NO. 27 BLANCHARD SURFACE GRINDER

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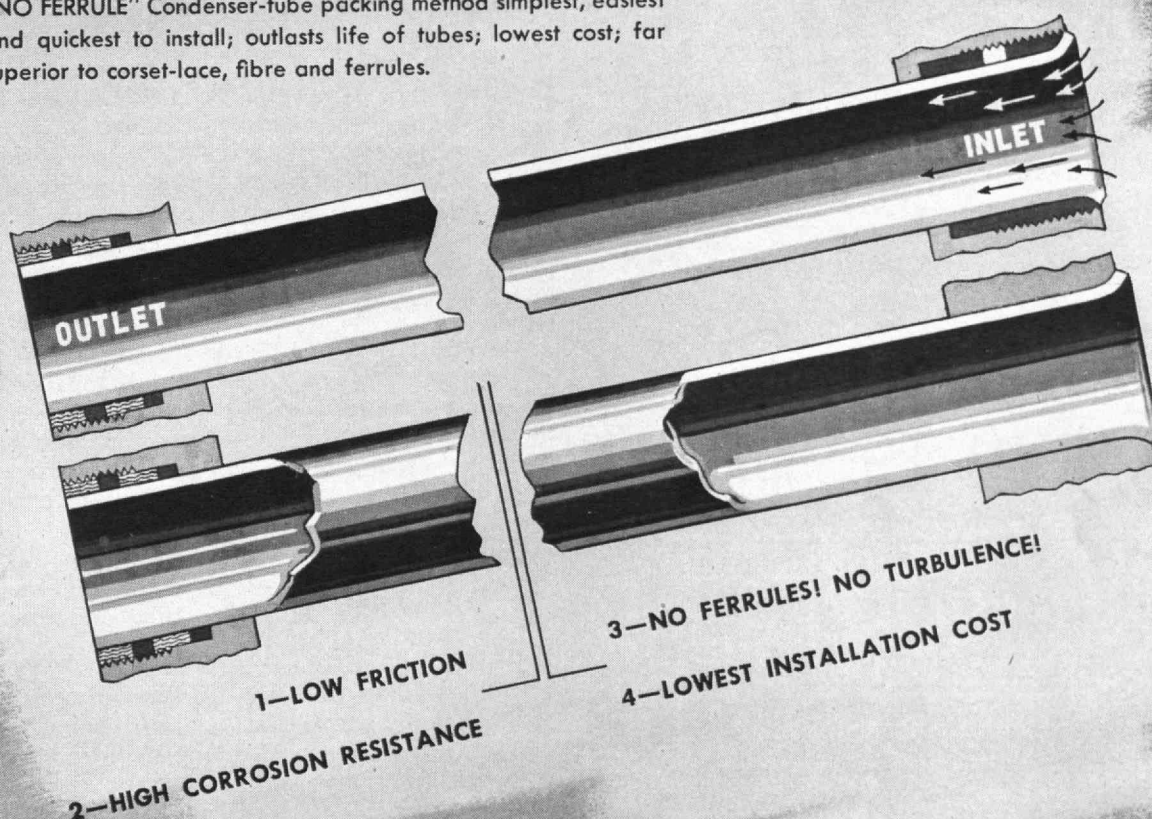


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WORK BOOK...

Make **CONDENSER** *tubes* *last* **MANY YEARS** *longer ...*

10,000 INSTALLATIONS

Naval, Marine and Industrial service proves John Crane Metallic "NO FERRULE" Condenser-tube packing method simplest, easiest and quickest to install; outlasts life of tubes; lowest cost; far superior to corset-lace, fibre and ferrules.



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The New John Crane "No Ferrule" method bonds the tube to the tube-sheet in this way:

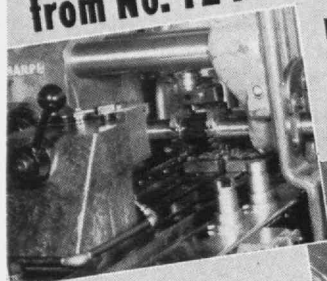
Illustration top left shows outlet-end of old condenser packed with Metallic and Fibre Expansion Rings. Perfect Bond. Free to expand . . . Inlet-end shows Fibre Expansion Bushing with Lead-slug-insert, bonding tube to tube sheet . . . On new condensers, bottom illustration, inlet-end is packed same as on old units. Outlet-end is belled (no packing). Ask for comparative studies showing advantages of metallic packings over fibre and corset-lace ferrules.

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Branches: Baltimore, Buffalo, Boston, Cleveland, Dallas, Detroit, Houston, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, Tulsa
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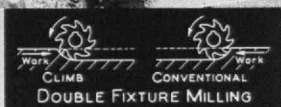
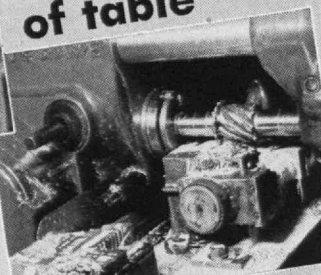
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The only world-wide service of its kind . . .
49 engineers in U. S. A., South America,
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Use a fixture
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of table



Climb mill in one
fixture and con-
ventional mill in
the other—one ma-
chine and one set
of cutters often can
do the work of two.



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Jacketed Kettles

Hemispherical or Stand-
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steel. All types of proc-
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THE TABULAR VIEW

Product Presages. — Improvements to be foreseen in the material appurtenances of life after the war are not to be regarded as incentives to winning the war: Our vital reasons for victory lie far too deep for that. Yet there is point in surveying means whereby at least one of the Four Freedoms may be implemented in time to come and whereby as well some of the problems of re-adjustment may be met. Prospects for one major industry were sketched for *The Review* in January by a noted engineer. A noted industrial designer this month (page 176) canvasses a number of manufacturing and allied activities to desery not merely what new things are to be, but more the industrial revolution which may be expected to attend the production of them. A graduate in 1920 of the College of the City of New York, CLARENCE P. HORNING has written often and well of subjects in his field of industrial design, in which he concentrates on product and trade-mark design, books, packaging, and maps.

Medicament. — War on malaria is an essential phase of war on the Axis, and a phase in which the Axis might have had a serious advantage but for the speed and effectiveness with which American chemical manufacturers have brought into production synthetic drugs matching in therapeutic value the quinine once supplied by the East Indies. RUDOLF E. GRUBER, '16, discusses the entire subject in this Review (page 179). Dr. Gruber, who is vice-president of Merck and Company, Inc., writes with the authority of firsthand experience in Java and Central America.

No Glue. — Research in ceramics goes forward steadily at Technology, and as fast as new techniques of investigation become available they are brought to bear on the problem. FREDERICK H. NORTON, '18, Associate Professor of Ceramics, explains in this issue (page 182) how clay has in recent months given up more of its secrets as a result.

Problem People. — Sometimes the forest bulks so large that it is easy not to see the trees; so it is in international matters, holds BERTHA S. W. DODGE, '22, in an essay (page 185) continuing the discussion of cultural relationships between nations initiated in the November Review by Robert G. Caldwell, Dean of Humanities at the Institute. Mrs. Dodge has known Central America through residence as well as travel, in Guatemala, in Costa Rica, and in Panama.

Polka Dots. — Our cover this month bears a photograph made some years ago by HAROLD E. EDGERTON, '27, Associate Professor of Electrical Measurements at Technology, for the Winchester Repeating Arms Company. It shows shot falling through one of the relatively few shot towers in the country. The polka-dot effect is the result of reflection of the stroboscopic light source on the shot during the 1/100,000-second flash, some of the images being out of focus.

... and we made a Sapphire!

YOU'RE LOOKING at a sapphire being made in the incandescent heat of a specially designed furnace... a synthetic sapphire... better than the natural gem. It takes hours to grow one of these sapphire boules.

What's so wonderful about it? Sapphire is necessary for the security of this country. Out of this jewel stone are made hard, long-wearing bearings for precision instruments. The various precision devices of a modern battleship require more than 4,000 jewels; about 100 more are needed in fire-control mechanisms. Modern pursuit planes and bombers require up to 100 sapphire bearings in their instruments.

In 1940, this country was completely dependent upon Europe for sapphire jewels. The call went out for American-made sapphire to meet this nation's needs.

Because we at Linde are experienced in the production of gases and in the accurate control of high temperature gas flames, we volunteered to try to make sapphire. After two years of experimental research, we learned how to produce the high-purity raw materials needed and also how to make sapphire from those materials. Today, we make more synthetic sapphire than this country ever imported from Europe... enough to meet all industrial and military needs. Thus America need never again be dependent upon an outside source.

Right now, we make colorless sapphire because colorless jewels make harder bearings. No sapphire is available for anything but war production. In the future we stand ready to make ruby and other gem stone materials for the jewelry trade... and for you.

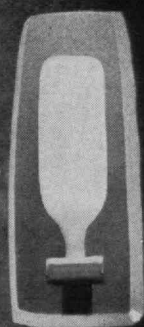
This research development by The Linde Air Products Company is paralleled by other recent achievements of Electro Metallurgical Company, Carbide and Carbon Chemicals Corporation, and National Carbon Company, Inc.—all of which are Units of Union Carbide and Carbon Corporation.

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation



GENERAL OFFICES: NEW YORK, N. Y.

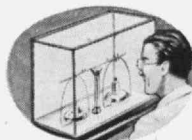
Offices in Principal Cities



HIS BEARINGS ARE RIGHT—Chronometers, compasses, and other navigational aids must be rugged as well as precise. Sapphire bearings can "take it."



FLYING JEWELS—Pilots' lives and the success of their missions depend upon accurate instruments. Sapphire bearings assure continued accuracy.



LABORATORY WARRIORS—Delicate balances, time instruments, and other important precision equipment of the research worker need sapphire jewels, too.



YOURS IN THE FUTURE—Flawless gems... such as rubies, sapphires, and spinel... made by this same Linde process... will be available for jewelry in the future.

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Hevi Duty Precision Electric Heat Treating Furnaces are built in a large variety of types and sizes — for many heat treating operations — with temperature ranges to 2500° F. (1371° C.). They are standard production equipment in many national industrial plants.

Write for descriptive bulletins

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District Manager
90 West Broadway
New York

ELTON E. STAPLES, '26
District Manager
205 W. Wacker Drive
Chicago, Ill.

MAIL RETURNS

Best of Luck

DEAR FELLOW ALUMNUS:

Today, to my surprise, I accidentally bumped into an issue of *The Review* — that for November. We were quite glad to see one since we have been away from the Institute for eight months now. I elected myself to let you know because of the fact that Uncle Sam elected us to represent the Class of '42 on this front. We have been overseas for five months now, and we are all going to apply for a job with Cook's Travel Service if and when we return. Maybe by now you are quite curious as to whom I refer to as "we."

Here we are: Tom Crowley, XV, Charlie Kelley, I, Bob Krucklin, I, and Okie O'Connor, III. It might be possible to inform the Secretary of the Class of 1926 that Captain Gustave R. Peterson is also in the battalion. Captain Charles R. Mills, '38, is likewise here. Lieutenant Robert M. Emery, '34, has been killed.

Well, best of luck to all, and chalk up all the Japs and Huns on the Walker wall.

Refugees from Axis bullets,

TOM, CHARLIE, BOB, OKIE.

P.S. Kelley received a silver star.

North Africa

Invitation

FROM HAROLD E. DATO, '41:

. . . The picture of the wagon wheel in the December issue struck my fancy, perhaps because it was very well placed in the make-up. . . Which brings to mind that this is about the time a new managing board would be elected for *The Tech*. If so, I should like to hear who the new men are.

One thing before I close. Undoubtedly quite a number of Technology men are out here in the armed services. Who and where they are I do not know. . . I should, however, like to have some of these men up to my place for the evening or over a week end for a bit of a respite from the monotony of service. You might pass the word along that all they need do is phone me or drop in at the address given below.
141 Merchant Street, Honolulu, T. H.

Antedated

FROM HALLOCK C. CAMPBELL:

I have greatly enjoyed the recent copies of *The Review*, particularly the articles on plywood and veneers, which antedated the display in *Life* by many months. . . .
Philadelphia, Pa.

Speed with Economy



*Air Reduction Sales Co.
(Alteration and Rehabilitation)*

After the war, in converting plants to peacetime products, there will undoubtedly be quite a demand for alteration and reconstruction. . . . You will find that we can offer you valuable suggestions on such projects — *based on long experience.*

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INDUSTRIAL CONSTRUCTION

Alfred T. Glassett, '20, Vice President

Single-cylinder test stands speed engine production...



Information supplied by an Industrial Publication

Single-cylinder aircraft-engine test stands in one aircraft engine plant are helping to speed production, while contributing to improvement in engine parts, and, consequently, to power plant performance.

These stands duplicate a regular, full-sized, 9 cylinder radial engine, except that eight of the cylinders have been removed and the drive shaft, instead of spinning a propeller, exerts its force against a brake mechanism for registering horsepower. With these single cylinders, engineers run tests on pistons, spark plugs, valves, piston rings, piston pins, intake and exhaust ports and cooling fins. Tests of hundreds of

variations and combinations are run quickly, saving not only the expense of operating a complete engine, but also valuable days of test time, and releasing the regular test cells for production use on full-sized engines. In addition, a test on a specific part can be run to the point of failure with the single-cylinder stands.

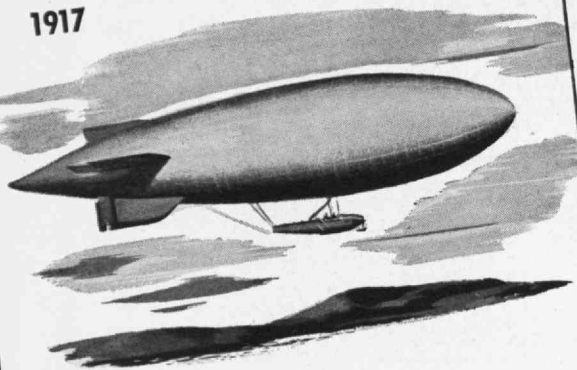
Design features in the cylinder and its component parts can be tested, modified, rejected, improved or approved before constructing a full-scale engine model for extensive ground and flight tests. Also, troubles cropping up in service engines can be relentlessly pursued.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE BRIQUETTES • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City

Trail Blazing in the Skies

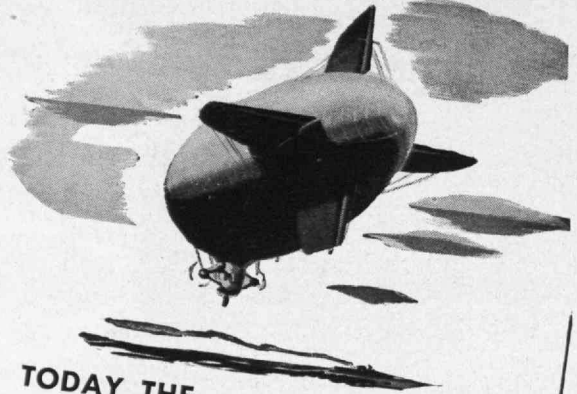
1917



THE FIRST SUCCESSFUL NON-RIGID AIRSHIP

ever used by the United States Navy was built by Goodyear in 1917. Before the close of World War I a considerable fleet was in active service in anti-submarine patrol duty and proved highly effective. After the war Goodyear continued further to develop and improve airships by building and operating its own squadron.

1943



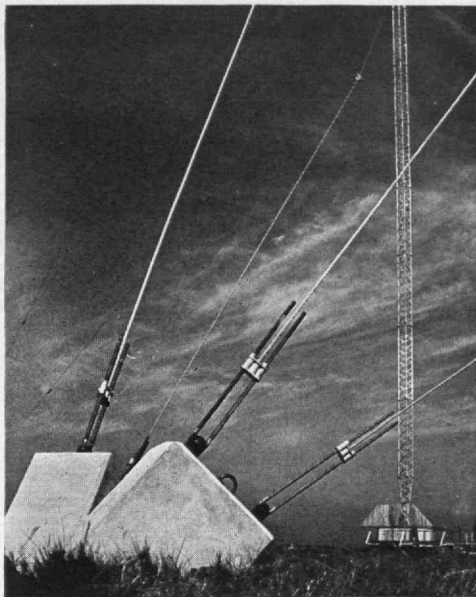
**TODAY THE
LARGEST NON-RIGID AIRSHIPS
EVER BUILT** are being produced by Goodyear for the Navy. Many are already in service along our coasts. These new ships have far greater range than their 1917 predecessors; carry a heavier bomb load and can stay aloft for days, if necessary. The ability to deliver these patrol ships rapidly and in quantity results from Goodyear's long pioneering in aeronautics.



GOOD YEAR AIRCRAFT

HOW GOODYEAR AIRCRAFT CORPORATION SERVES THE AIRPLANE INDUSTRY

1. By building parts to manufacturers' specifications.
2. By designing parts for all types of planes.
3. By re-engineering parts for mass production.
4. By extending our research facilities to aid the solution of any design or construction problem.



Daniel S. McDermott, '45

Radials and radiator — guys and an antenna tower

VOLUME 45

NUMBER 4

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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In the valley of Esdraelon, but a few miles west of Nazareth, by the road to Tiberias on the Sea of Galilee, is this village. It is the colony of Nahalal, established in 1921 by the Jewish National Fund and the Keren Hayesod, the two chief public agencies concerned with development of Jewish settlement in Palestine.

THE TECHNOLOGY REVIEW

Vol. 45, No. 4



February, 1943

The Trend of Affairs

Again the Electron Microscope

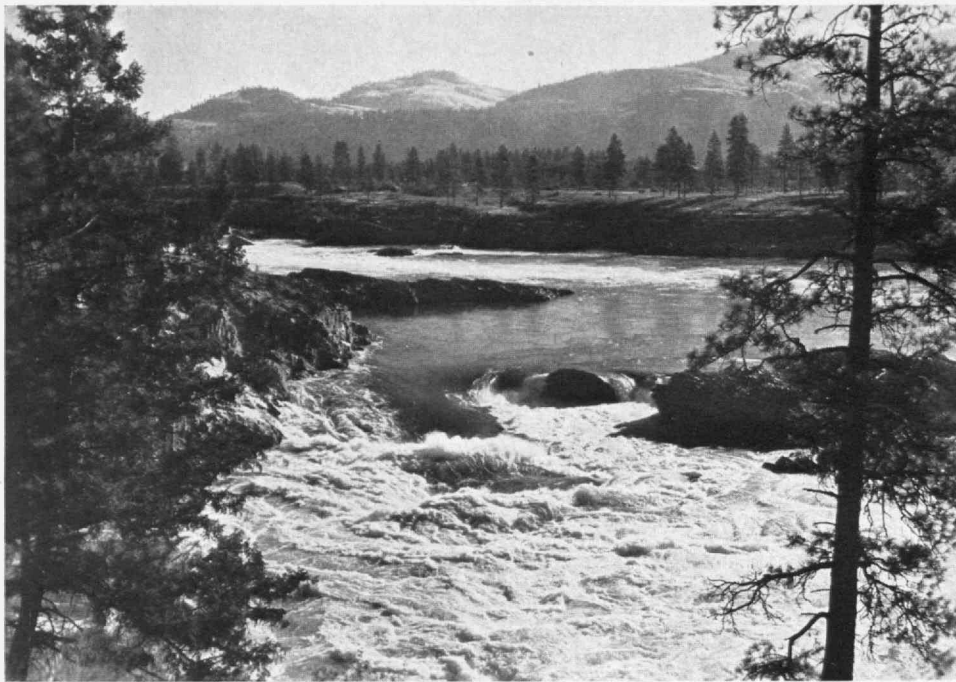
FOR those with the necessary priorities and about \$2,000, there was placed on sale two months ago, in a highly developed, compact, and easily operated form, one of the more significant achievements of Twentieth Century science — the electron microscope. An electron microscope has already been on sale in this country for well over a year — a large unit, seven feet high, which can yield images enlarged up to 20,000 times and of such high resolution that they can be enlarged photographically to 100,000 diameters. The new units, however, are much smaller, cost about one-fifth as much as the larger model, and, while not possessing the extreme range of that unit, can magnify up to 10,000 diameters. In ten years this major invention has leaped from theory to routine everyday use in a dozen fields.

Television and cathode-ray oscillography are two arts which have profited by the fact that electrostatic and electromagnetic fields can bend streams of charged particles, much as the optical lens bends light. Utilizing this phenomenon, the oscillographer relies on electrons as particles which will make a fluorescent screen glow and therefore will give him a line, or trace, indicating data. But electrons are shown by wave mechanics to be something more or something less than particles. At about the same time that Hans Busch demonstrated the bending power of fields on electron beams — that is, some 15 years ago — the Nobel prizemen Louis-Victor de Broglie and Clinton J. Davisson, among others, were demonstrating that particles of atomic and subatomic dimensions partake also of the nature of waves when in motion. It remained for the two concepts to be combined. Compound electromagnetic lenses were being used in Europe by 1932 to focus rays of electrons; two years thereafter Ladislaus Marton, who is now in the

United States, was using them to study biological phenomena. The electron microscope — crude, crotchety, and then a tough job for even a physicist to keep in satisfactory operation — had been invented.

The intense interest which the electron microscope continues to arouse all over the world stems originally from the fact that the wavelengths associated with electrons are far smaller than those with which we see. The shortest wavelengths to which the human eye can respond measure about 4,000 angstrom units (0.00004 centimeter), and lenses of special materials like quartz and fluorite can pass radiation extending some 1,000 or 2,000 angstrom units farther into the ultraviolet, the results, of course, being made visible photographically. But the wavelengths associated with electrons are in the order of tens of thousands of times shorter, and since a direct proportionality is believed to exist between the smallest object which can be recognized and the wavelength used for "seeing" it, a like ratio should exist between the maximum magnification which is possible with the light or ultraviolet microscope and that which is available with the electron microscope. It doesn't — at least not yet.

In terms of useful magnifications, the limit of the visible-light microscope is about 1,400 diameters; of the ultraviolet microscope, 2,000 diameters; and of the electron microscope, 100,000 diameters. The magnifications used most widely in practice with the large instrument, however, are reported to lie between 4,000 and 10,000 diameters. On the basis of theory, the electron microscope should be able to resolve particles of atomic dimensions, but present magnetic lenses are so far from perfection that the theoretical capabilities of the instrument are still a long distance from being realized. The light microscope was invented about 1590; three centuries were necessary for its full possibilities to be approached.



U. S. Bureau of Reclamation

Where Kettle Falls, the only cataracts in the upper Columbia River, once posed this problem for river travelers, the backwater from Grand Coulee Dam, 100 miles downstream, now lies slack.

The electron microscope is inherently a far more complicated device than the light microscope. Diagrams may be drawn showing a close analogy between the lens systems, but these diagrams do not indicate that a high vacuum must be maintained within the electronic apparatus, that the specimen being studied must also be within the vacuum, and that the power supplies which accelerate and focus the electron beam must not only be of high voltage but also of extreme stability, for a variation in the voltage supplied to the magnetic lenses is equivalent to a change in the focal length of a glass lens. Certain of the voltages which are employed in the electron microscope are maintained constant to within 0.002 per cent.

The versatility of the large instrument has lately been increased by the development of an adapter which replaces one of the lenses and enables the microscope to be used as an electron-diffraction camera, permitting a micrograph and a diffraction pattern to be made of the same specimen within a few minutes. The diffraction camera is a comparatively old tool of the physicist, but few physicists have hitherto been able to put together an instrument which had a power supply comparable in stability to that of the commercial electron microscope and which therefore could hold its calibration for as long a time.

Because the electron microscope "sees" with electrons, the thickness of the specimen is an important limitation; the electrons, when accelerated by about 60,000 volts, are not able to reveal the structure of organic materials more than perhaps one hundred-thousandth of an inch thick. Penetrating power is increased with higher voltage, and an experimental unit has been built which can operate at values up to 300,000 volts, but a more versatile method for studying thick or opaque specimens (as, for example, in metal-

lurgy) is making extremely thin replicas of the surface and examining these rather than the object itself. Although the techniques vary in detail, they consist essentially of flowing an extremely thin film of dissolved plastic over the surface, letting the film solidify, then carefully stripping it off.

Another approach, still in the developmental stage, is the scanning electron microscope which, if it ever comes to the attention of Rube Goldberg, should certainly send him into retirement. In this device, a beam of electrons is focused to form a spot about one two-millionth of an inch in diameter. The spot is then made to sweep slowly back and forth across the surface of the specimen being observed, just as an image is scanned in a tele-

vision camera. The electrons striking the specimen force it to give off secondary electrons, which are accelerated by an electric field and strike a fluorescent screen. The light from the screen is gathered by a lens and made to fall on a multiplier photocell, itself an invention with major possibilities. This tube acts as a virtually noise-free amplifier, a necessity in view of the extremely small currents available as a signal. The output of the multiplier photocell, after being amplified again, is filtered and then used to operate a facsimile recorder, which prints a picture that can be examined at leisure. All this in the endeavor to obtain independence of the thickness of the specimen.

That the electron microscope is still far from its ultimate limitations is a cause for hope rather than the reverse. Already it has advanced the frontiers of science. If it creates entirely new sciences, it will not be the first time that a new tool has done so.

Tabs

LIGHTWEIGHT laminated plastic is being used instead of steel in the license tabs required for all motor-truck plates in Massachusetts this year. Saving of 16,000 pounds of war-necessary steel and reduction of 75 per cent in postage necessary for mailing the tabs are advantages of the change. In the manufacture of the tabs, printed sheets bearing the required design are placed on resin-impregnated sheets of paper, backed by a filler, and covered by a translucent sheet; the whole assembly then is bonded together by pressure of about 1,500 pounds at a temperature of approximately 250 degrees Fahrenheit.

Occupying but a few minutes, the pressing operation is reported to combine the sheets into a homogeneous product of good strength and resistance to weather.

Alcan, Burma Road, et al.

PROJECTED officially since 1930, an overland highway connection with Alaska emerged from the realm of discussion one year ago this month. By then, security considerations were paramount and had superseded economic reservations as well as resolved disagreement over proposed routes through the selection of another farther inland, one which followed the path of the airway between Edmonton and Fairbanks.

Ultimately the construction force numbered 10,000 soldiers, divided into seven Army engineer regiments, and 2,000 civilian workmen of the Public Roads Administration, all under the direction of Brigadier General William M. Hoge, '22. In March, a vanguard began its labors at the highway's southern terminus, the settlement of Dawson Creek in the Peace River block of eastern British Columbia. Here, at the end point of the Northern Alberta railway's main stem, supplies hauled 495 miles from Edmonton — half as far as the rail distance from Boston to Chicago — facilitated quick establishment of advanced bases at near-by Fort St. John and at Fort Nelson 250 miles farther north.

This task had to be accomplished while the ground remained frozen, but work on the more northerly portions of the route in Yukon Territory and Alaska, being partially dependent upon river transport of supplies, was necessarily delayed until after the thaw had set in.

In May, troops landed by sea at Skagway moved via the 111-mile narrow gauge of the White Pass and Yukon route of Klondike days to base at Whitehorse, Yukon Territory. Others, debarked in that same month at Valdez on the southern Alaska Coast, pressed inland and commenced work nearer Fairbanks, which was to become the northern terminus of the highway. There it would connect again with steel, that of the government-owned and -operated Alaska railroad, 470 miles north from the tidewater entrepôt of Seward.

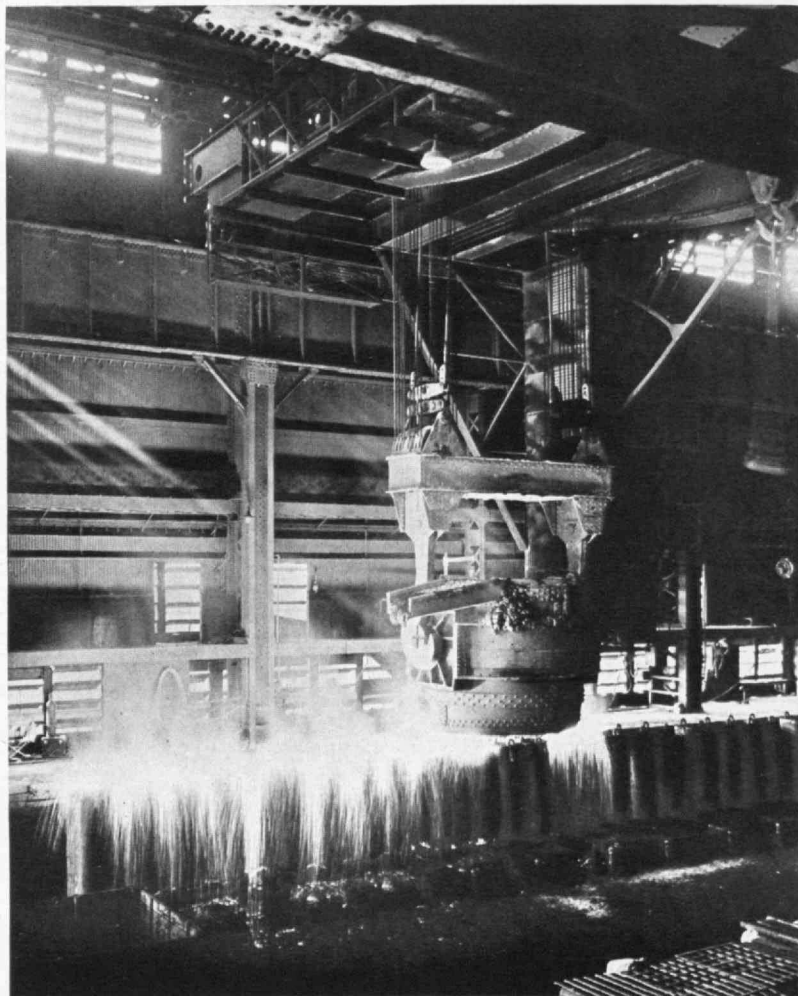
During the summer, construction advanced at the rate of about eight miles a day, and on November 20 the highway was formally opened in a simple ceremony at a point on Soldier's Summit, midway between Whitehorse and the Alaska boundary. But trucks had begun to roll the entire length in October.

It must not be supposed that the Alcan Highway — the Canalska, as Canadians prefer to call it — has early prospects of becoming any Pennsylvania Turnpike or Merritt Parkway. On the contrary, and especially when the muskeg begins to re-ooze under the warmth of a late subarctic spring, many sections will be reminiscent of what confronted motorists 20 years ago when negotiating the gumbo belts of Iowa or Missouri. Future replacement of many

bridges, refilling of washouts, and mastering of natural settlements are to be anticipated, and some of these inevitable maintenance problems have been discounted. Yet for a long while the Alcan is bound to retain its counterparts of toughgoing incidents like the Medicine Bow stretch on the old Lincoln or the Arizona strip of U. S. 91, each hazardous and memorable well into the 1930's.

Nevertheless the Alcan, strategic channel for overland truck transport rather than boulevard, is a truly astounding engineering achievement. Laid down in less than six months of actual building time, through an unsettled mountainous wilderness hitherto largely unsurveyed or unexplored save from the air, with extremes of temperature ranging from 35 below to 90 above, and with more than 200 unpredictable streams to cross — this highway is an artery 1,671 miles long, the equivalent of the road distance between New Orleans and Ottawa, or between Baltimore and Denver, or a good day's driving longer than that from Seattle to San Diego.

In length as well as in formidable obstacles encountered, the Alcan compares favorably with two previously publicized highways finished under the driving pressure of war needs: the Burma Road, 726 miles from Lashio, Burma, to Kunming (old Yünnanfu) in southwestern China; and the Australian Defense Highway, 630 miles between the railheads at Alice Springs and Birdum, plus a 316-mile extension northward (*Continued on page 206*)



Shafted sunlight and molten metal against the somber shadows of a steel mill

Fred G. Korth from Carnegie-Illinois Steel Corporation

Design Futures

An Industrial Revolution Is to Be Foreseen with the Return of Peace; Trends in Various Manufacturing Activities Suggest Manifold Changes in Postwar Years

BY CLARENCE P. HORNING

EVERY American is wondering what surprises lie ahead in his future civilian life. He has watched the exciting pace of the complete change-over to a war economy. He has observed the birth of new technological processes and discoveries. He has witnessed the disappearance of a thousand and one articles of everyday use and, in many instances, rapid replacement of them. This phenomenon has conditioned him to expect a continuation of miracles. In surveying the outlook for tomorrow, he asks whether his home will revolve about a central axis and so face the maximum sunlight at all times of day; whether his food will be presented in capsule form; whether his motor plane will tuck its wings underneath as it taxis down the garage lane at the close of day. This sort of long-range forecasting, popular for generations, is especially prevalent now. We have come to realize that the laboratory experiments of yesterday become the marketable realities of today, only to pass on to obsolescence. This is but the natural pattern of industrial progress, and we have become adapted to it.

Today, more undeniably than ever before, the eyes of all are turned with hope toward the dawn of stability for our civilization. The complete rightabout-face from production of munitions and war matériel to peacetime goods will call for the most colossal reorganization of our economic system. Our machines which have been providing the sinews of war must be prepared, with carefully planned programs, models, and dies, to pound out again the tools and instruments to meet the needs of a normal world. When the millions of men and women return from the services, they will form a new army of eager buyers hastening to markets that have been depleted of stocks of consumers' goods. Appetites will be keen for every conceivable commodity, but the shortage of spare cash will turn many potential purchases into disappointment. To meet these lean pocket-books, we shall have developed abundant resources of both raw and synthetic materials unknown before the war and now readily adaptable for mass production under new conditions. Abroad, whole areas of blitzed countries devastated beyond recognition will cry out for machinery, tools, and products. Rehabilitation will involve vast schemes of urban and civic improvement, slum clearance, and reconstruction of industrial districts. To meet unprecedented overseas demands, our maritime transportation system will be augmented by fleets of giant air cargo carriers spanning the seven seas.

At home, a dangerous temptation will face the manufacturer. Urgent needs arising daily will offer wide-open markets for products of all kinds. Some producers may

take advantage of this runaway sellers' market to turn out inferior goods, but the wise merchant knows that practice of this sort may lead to disaster. This phase of transition, from hectic and indiscriminate buying to a quieter normalcy, will solve itself in time, giving way to a more responsible order in which products again maintain their standards of tested quality combined with taste, durability, and efficiency.

Manufacturers and designers both are laying special stress on the growing importance of the feminine point of view. Increasing steadily since World War I first gave occupational employment to many millions of women, this potent force has reached new peaks. The gradual infiltration of women into factories during the past two decades has culminated in the present all-time high, with every indication that the number will rise materially. As women workers have replaced and released their husbands and sweethearts for military service, their eyes have been opened to new capabilities. They have shown themselves able to master many technical problems with skill and agility. They have demonstrated their competence to fill administrative positions wherein significant policies are determined. This penetration into the affairs of both labor and management may have a profound effect upon the whole trend of industrial life. From all the practical knowledge gained through wartime employment, a truer sense of values, tempered by the woman's angle, will most certainly develop. Simpler clothes, more efficient appliances, fewer useless gadgets, less luxurious homes, more spacesaving and laborsaving devices will become watchwords of postwar woman-kind.

Many, possibly most, of the women will return to home life after the reconstruction period has run its course. Yet a sizable number will continue in their present working positions. They will be actual operatives and will turn out more goods than feminine hands ever before produced in peacetime. Working conditions in many present second-rate factories will not be tolerated: Poorly lighted and badly ventilated shoprooms will go; inadequate facilities will give way to greater comforts and recreational opportunities for female workers.

Manufacturers will face many hardships in attempting to supply enormous demands, but beyond all difficulties of labor and material shortages they will face a major economic conflict between two opposing forces: on the one hand, a world hungry for all the human needs that have been denied or restricted by shortages of many years' standing; on the other hand, purchasing power greatly reduced by a curtailment of present wage

scales and overtime earnings. Family incomes are likely to be cut, while the needs for replacements become greater. The burden of satisfying these diametric opposites rests squarely with the producers and their industrial designers, whose combined ingenuity will be tested as never before. One result is bound to be a complete standardization of product designs, with fewer models and the elimination of frills and extras. Pooling arrangements between manufacturers, joint ownership of basic patents carefully supervised by government control, closer co-operation between producing groups and trade associations will effect economies all along the line. To fill the need for more goods at reduced prices, new processes and new materials are being developed, for these are the prerequisites around which all future planning must revolve.

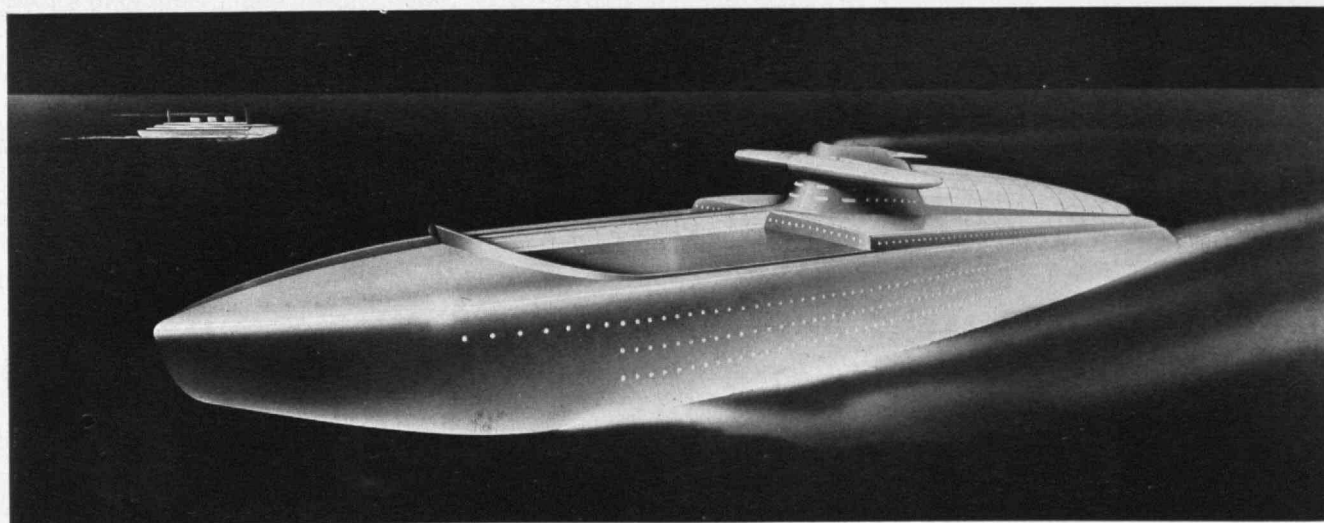
The industrial revolution ahead of us, following upon the heels of the current upheaval, will force whole industries into conversion or reconversion and many into obsolescence. Factories that have been forced to shut down completely may never again see the light of day, whereas others, in which valuable equipment has been commandeered, will undergo drastic reorganizations. Many small shops and plants will find accustomed raw materials no longer available, possibly replaced by a synthetic which those plants are not geared to handle. Many a construction or contracting firm with men trained to traditional routine will be ill prepared to cope with such tasks as are presented by prefabricated housing projects, for instance.

Donald Nelson sounded the keynote to this age of innovation when he asked for "a better way to do almost everything." New experiences with close tolerances and hard steel will affect the construction industry and its methods. New aluminum and magnesium alloys, plastics, ceramics, synthetic fibers, plywood processes point the way to better and cheaper uses than are possible with the products and methods they will displace. The whole development of synthetic rubber, new oils and gasolines, new drugs, and whatnots will undoubtedly

produce combinations which in turn will be applied with realistic rather than visionary utility. Previews of trends in but a few of these specific fields — plastics, synthetic rubber, textiles, home furnishings, packaging, automobiles, and aviation — will indicate some of the revolutionary changes which seem likely to follow in the wake of war.

THE rapid progress of no other new technical field has so fired the public's imagination as has that of plastics. Since 1907, when Leo Baekeland announced the harnessing of the phenol-formaldehyde reaction, a steady growth of research and product development has made possible motion-picture films, television, innumerable home appliances, industrial installations and machines, five-and-ten-cent-store novelties, and so on. The public in its enthusiasm has come to regard plastics as the answer to many prayers for the comforts of modern living. The glamourization attendant on each new important use has made people wonder — if toothbrushes, telephones, and ladies' slippers, why not whole automobiles, planes, and homes? These very dreams have in part been realized in a thousand laboratories throughout the nation, awaiting only that great day when the floodgates of free production will be opened upon a waiting world.

Supplementing the molded plastics and allied with them in a broad chemical sense are the laminated materials. Paper, textiles, and so on, are resin impregnated and treated under heat and pressure to give infusible, water-resistant surfaces. Stronger than cast iron, laminated material has 90 per cent the tensile strength of aluminum at one-third its weight. In sheet form the synthetic resins are daily finding such new uses as containers, clothing, footwear, and bookbindings. Robert J. Moore, manager of development laboratories of the Bakelite Corporation, depicts tomorrow's wonders in the new "kingdom of synthetics, adding a fourth kingdom to the already familiar group of animal, vegetable, and mineral." He says:



An ocean liner, with the same V-type hull as the speedboat, is envisioned by Raymond Loewy, industrial designer. While air travel is expected to supersede the bulk of marine transportation in the future, such an all-metal liner, designed for luxury cruising, might cross the Atlantic in two days. Design features include turboelectric power, a single smokestack above the "airplane bridge," a glass-enclosed dome-shaped afterdeck, and a wave breaker on the bow end. The cargo would be carried forward.

The great development of today is synthetic resin plywood, which is the basis of the so-called plywood plane and the glider—streamlined to give speed in production as well as greatest speed in the air. Such resin-bonded plywood is the structural material of the PT torpedo boats and the great cargo planes now being built by Henry Kaiser and Howard Hughes. To make plywood, thin veneers of wood are placed together, alternating the grain of each ply at right angles to the adjoining ply. The synthetic resin glue, because of its strength and because it is not affected by moisture, high humidity, or fungus growth, has in the past few years rapidly displaced animal and vegetable glues. Huge sheets are now fabricated and actually molded to curved surfaces, so that one section 84 feet long may be used for the side of a torpedo boat. When the plies of wood are all glued in the same grain direction, the extremely strong laminated wood is produced. The next step in utilization of wood has been to impregnate the laminated wood with the phenolic resin in the B stage, then set it under heat and pressure. This process gives the new product called "compreg," which is the material of greatest weight-strength ratio, stronger than alloy steels.

A recent development which bids fair to influence the future is the synthetic resin printing plate and matrix, replacing metal electrotypes and stereotypes. These new plates have fidelity of reproduction up to 175-line screens and weigh only one-eighth as much as the conventional metal plate of the same area.

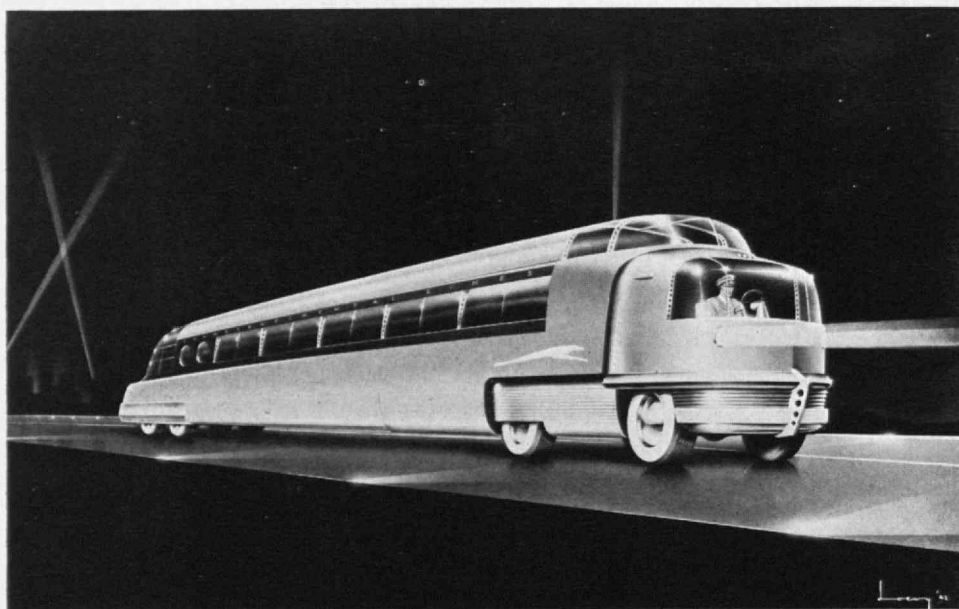
Chemistry has revolutionized many industries, but there is possibly no better example of the impact of these products of the "fourth kingdom" than the effect of synthetic resins on the paint and varnish industry. Resins and oils used from early times have given way to quick-drying synthetic resin products wherever speed coupled with protection and durability is required. Today's air-drying varnishes and enamels, the coatings for ships and planes and bridges, are based upon synthetic resins. Aircraft primers of the highest durability dry in one minute.

The now all-too-familiar story of the United Nations' being bereft of the world's rubber riches and their desperate need for quickened development of rubberlike materials has led to a race against time in this vital field.

The public follows with intense interest the laboratory search for substitutes and the pursuant production of synthetic rubbers. Buna types, Thiokol, Neoprene, Resistoflex, Hycar, Butyl, Koroseal, Chemigum, Vistanex, and Pliofilm are the leaders in the effort to avoid the depletion of our present supplies. Many of the synthetics have certain improved properties over natural rubber, especially in resistance to deterioration by oils and organic solvents. Many have shown satisfactory resistance to wear, aging, and oxidation. But natural rubber still has a decided edge in elasticity, resiliency, and endurance under freezing temperatures. Improvements are being made constantly in the synthetics, and it is not too much to expect that before long they not merely will equal caoutchouc's elastic, processing, and wearing properties but will be superior in every way.

Fresh discoveries in textiles have frequently surpassed their prototypes and placed at the disposal of the manufacturer an entire new set of working materials. In a reasonable time, man may expect to see the development of fibers from seaweed, yucca, and coarse flax, of interest not only to the textile field but to the cordage industry, for hems and sisals have all but disappeared from our markets. Moreover, his next year's felt hat will be made of casein, his straw hat will be fabricated of cotton, and his camel's-hair coat will be spun of nylon with mercerized cotton backing. Glass is being drawn through minute orifices to make an extremely fine filament which is woven into silkenlike, noninflammable textiles. So delicate is this thread that a small ball of glass the size of a marble may be drawn into a filament 90 miles long. Specially treated cellulose is already replacing leather to a large extent, while recently announced improvements promise further advances in this direction.

Within the four walls of our dwelling places, where most Americans still live amid the cluttering remnants of eclecticism, are due to come the greatest innovations in living comforts. Current trends in furniture featuring form-fitting chairs of bentwood and plywood construction, sectional chests and (Continued on page 201)



In order to free passenger space for 50 or more people, a four-wheel-drive power unit pulls this trailer transport, which is also from Mr. Loewy's portfolio. Intended for use on superhighways such as the Pennsylvania Turnpike, this luxurious motor vehicle is constructed of light-metal alloys. Design highlights are the forward observation cupola and rear observation lounge, buffet bar with attendant, men's and women's chemical toilets, air conditioning, and faired-in undercarriage and storage space.

Antimalarial Ammunition

Synthetic Drugs Will Match Former World Quinine Production in Curative Power

BY RUDOLF E. GRUBER

MALARIA is the leading communicable disease affecting mankind and exceeds all others in its widespread geographical distribution, with serious focuses in almost all hot countries. In the Western Hemisphere, malaria ranges from the southern United States, where it is endemic in 17 states, to the Río de la Plata in Argentina. Most Mediterranean countries, great parts of Russia and China, equatorial and southern Africa, and the Malay Archipelago are hotbeds of infection. Writing only recently from New Delhi, the New York *Herald Tribune* correspondent, Sonya Tamara, reported to her paper that in India, which has an annual toll of over 1,500,000 deaths from malaria, the disease again had reached epidemic proportions. Thus in all the most important areas in this global war, the forces of the United Nations will be exposed to infection from malaria. For this reason, the fight against it has suddenly become one of major importance to us, as has the problem of supplying antimalarial drugs, without which troops cannot operate successfully in endemic malarial areas.

Since quinine is still the most all-round useful antimalarial drug, a discussion of the battle against malaria would not be complete without a review of its history and present production status. We have become so familiar with quinine over the years that it took the tragedy of Pearl Harbor to bring home to us the realization of our dependence on overseas supplies of this drug, indispensable for our war economy and for the health of our fighting forces.

The early history of cinchona has been shrouded in tradition, and much of our present-day knowledge is based on reports by travelers and explorers, the accuracy of whose stories was bound to suffer on retelling. Lately, however, a number of facts have come to light as the result of documentary search by South American scientists. Dr. Juan A. Dominguez, noted botanist of Buenos Aires, recently discovered evidence dating back to the end of the Thirteenth or the beginning of the Fourteenth Century that the *yara-chucchu* bark (erroneously called "quina") was part of the medical armamentarium of the Incas, the enlightened ruling families of the Peruvian Quechuan tribes, whose influence at that time extended as far as northwestern Argentina. This evidence definitely disproves the story that the medical use of cinchona bark was unknown to the Indians before the arrival of the Spanish conquistadors.

A new version of the familiar story of the introduction of cinchona bark as a medicinal agent into Europe is supported by lately discovered documentary evidence in the daily chronicle of the times, telling of the arrival

of the Count del Chinchón in Peru in 1629 to take up the duties of Spanish viceroy and of the attacks of recurring fevers to which he became subject. Despite traditional treatment at the hands of the court physician, Dr. Juan de Vega, the count's condition grew steadily worse.

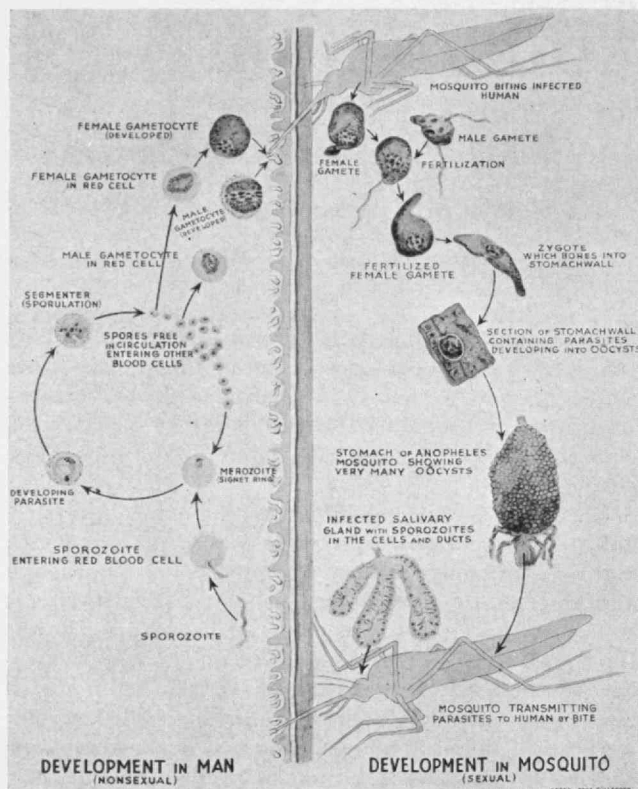
The Countess del Chinchón obtained some of the bark, known by the Indians to possess curative properties, and she, probably without the physician's knowledge, administered the drug to her husband. After 10 years of suffering, the viceroy was cured of his fevers. He and the countess set out for Spain, but on the way she was stricken with a fatal illness and never reached home. It may be supposed that she was carrying with her some of the precious bark which had cured her husband and that by his hand the bark finally reached Spain. There it was at first called "Countess's Powder" (*Polvo de Condesa*). Later the name of "cinchona" was given to the plant by the great botanist Linnaeus.

Until the discovery of quinine itself, cinchona bark was employed exclusively in the form of decoctions, wine, extracts, or tinctures. Not until 1820 did two French pharmacists, Pelletier and Caventou, isolate and identify quinine as a crystalline compound. Two years after its isolation from cinchona bark, quinine was first produced on a commercial scale in the United States by two Philadelphia chemists.

The cinchona tree for successful development requires an altitude of 3,000 to 7,000 feet, a well-distributed annual rainfall of 98 to 137 inches, and a temperature ranging between 48 and 86 degrees Fahrenheit, without night frosts. Plantation areas are usually terraced to avoid erosion of the fertile topsoil, and by means of these terraces, hillsides too steep for other cultures can be put to use for growing cinchona trees. Cinchonas are propagated by grafting or from seeds.

The early South American bark-harvesting practice was primitive and wasteful. Specially trained Indians, known as "cascarilleros," hunted out the cinchona trees, felled them by cutting close to the root, and then stripped the bark. The latter was dried in the sun or before the fire, giving either sheets from the trunk and main branches or tubes and pipes from the smaller ones.

This practice was the origin of the pharmaceutical terms "china plana" and "china convoluta." The bark was transported on muleback to Arica (from Bolivia and Peru), to Guayaquil (from Ecuador), to Barranquilla and Cartagena (from Colombia), and to Maracaibo and Porto Cabello (from Venezuela). The main markets for the South American bark were London, New York, Paris, and Hamburg.



The malarial cycle. On the left, the young malarial parasites enter red blood cells in man, grow, reproduce, and divide until the cells break up releasing spores to repeat the process. On the right, the mosquito draws from an infected person the sexual forms of the parasite, which reproduce in the mosquito's stomach, generating new parasites that in turn are introduced into the human blood stream.

Quinine manufacturers in France, England, and America were constantly embarrassed by the irregularity of the Peruvian bark supply. To remedy the condition, plants and seeds were obtained from the Andes and transplanted to India and to Java, where great cinchona plantations eventually were established. Several species of cinchona were introduced into Java, but the most important proved to be the *Cinchona ledgeriana*, named after the British merchant George Ledger (1865), and the sturdy *C. succirubra* (red sapped), which was introduced into Java via British India in 1862. *Succirubra* is now used mainly for grafting with the quinine-rich *ledgeriana*. Thirty to 40 species of cinchona have been distinguished, almost all having their habitat in the Andean forests.

Three centuries elapsed after the discovery of cinchona in South America before it was introduced into Java by the Netherlands Government. Yet less than 60 years later, practically the world's entire supply (estimated at over 20,000,000 ounces quinine equivalent) was produced there and in Sumatra because of the efficient cultivation methods employed by the Dutch. Ninety per cent of the crop was harvested on Dutch estates, the other 10 per cent being the production of plantations financed mostly by British manufacturers and, more recently, by Japanese interests. Thus the history of the cinchona industry presents a striking parallel to the introduction into Malaya and Java of the rubber-producing plant, *Hevea brasiliensis*.

The danger inherent in our dependence on centralized overseas supplies of quinine was recognized by our government a number of years before Pearl Harbor, and by good fortune we were able to supplement our stock pile of quinine by moving large quantities of cinchona bark out of Java and Sumatra before last March, when the Japanese invasion of those islands deprived the United Nations of 90 per cent of the world's supply of quinine.

Production facilities for cinchona in Latin America were surveyed a number of years ago by the United States Government with the aid of the late Victor E. Ruehl, who previously had explored various cinchona-producing locations in Central and South America in behalf of an American quinine manufacturer. It was under his direction that the growing of cinchona had been revived in the highlands of Guatemala, where the American firm operates an experimental plantation, El Naranjo, situated on the Pacific slope of Santa Clara Volcano, just west of Guatemala's beautiful crater lake, Atitlán. The Guatemalan cinchona industry made an ill-fated start about 80 years ago. In 1860, Julio Rossignon, a Belgian coffee producer, first planted cinchona in the region of Cobán, using seeds of unknown origin but most likely obtained from Peru or Ecuador. Rossignon's activities were not more than an experimental hobby, but they stimulated the interest of other Guatemalan coffee planters, with the result that in 1875 the Sarg brothers planted a few trees in the same region. These trees had been developed from seeds which came from Jamaica, where they had been sent from Ceylon by the British Government for experimental planting.

The Guatemalan Government now began to take notice and, at the instance of Manuel Herrera, minister of agriculture under the progressive President Justo Rufino Barrios, employed an English expert, W. J. Forsyth, to supervise experimental plantings of the tree. It was not long before groves of cinchona appeared in many locations, and enthusiastic local authorities set out trees along highways, schoolyards, and field enclosures, where some of their descendants may be seen today. The locations chosen by Mr. Forsyth appeared to be admirably suited for the growth of the trees, but unfortunately no attention apparently had been paid to the selection of species which would yield a high quinine alkaloid content in the bark. The *succirubras* and hybrids grew beautifully, and the Guatemalan Government looked forward to a profitable new pay crop. When the bark was harvested 10 years later, however, it proved so low in alkaloid content that in spite of the high price level prevailing for it in 1885, the crop was not worth even the cost of transportation to the European markets. Because of this disappointment, the Guatemalan cinchona venture lay dormant until 1930, when experimental projects were revived by Colonel Ruehl on a systematic basis. At El Naranjo, agronomists, botanists, geneticists, and chemists are carrying on carefully planned investigation to determine which species of cinchona or hybrids will give the highest crop yield under various climatic and soil conditions. Thousands of quinine assays are being run on young trees and even on seedlings, to speed the solution of the problem.

Our government now has available firsthand knowledge of the cultivation of cinchona in the Western Hemisphere. But 10 years or more must elapse between the planting of seedlings and the peak harvesting of the bark. Thus the first commercial harvesting of bark from the new plantings in tropical America is still several years away, and emergency production in the meantime must depend on increased harvesting from present wild cinchona trees. The progress so far indicates that the Western Hemisphere can and will become entirely independent of Far Eastern quinine sources.

About 30 distinct alkaloids have been identified as constituents of cinchona. Besides quinine, which is by far the most important, only three other alkaloidal salts are officially recognized as of value in medicine; these are quinidine, cinchonine, and cinchonidine. The entire supply of quinine in all forms has been purchased by the United States Army and Navy for use by our armed services. In the meantime totaquine, a mixture of these alkaloids, has been made available for use in medical practice. Totaquine is described in the supplement to the twelfth edition of "The Pharmacopœia of the United States of America" as "a mixture of alkaloids from the bark of *Cinchona succirubra* Pavon and other suitable species of *Cinchona*." It contains not less than 7 per cent and not more than 12 per cent of anhydrous quinine, and a total of not less than 70 per cent and not more than 80 per cent of the anhydrous crystallizable cinchona alkaloids: quinine, quinidine, cinchonine, and cinchonidine. The recommended dose of totaquine is 10 grains three times daily for seven days.

Essential progress in the treatment of malaria was made when quinine was isolated from cinchona bark in 1820. But until Alphonse Laveran in 1880 discovered the Plasmodium, and Sir Ronald Ross in 1898 incriminated the Anopheles mosquito as the transmitting agent and spreader of the disease, the quinine treatment was on an entirely empirical basis. An accepted definition for malaria is as follows: "A group of infectious fevers characterized by marked periodicity, and caused by the penetration and destruction of the red blood cells by a protozoan parasite (Class Sporozoa, Genus Plasmodium) transmitted by the anopheline mosquito (definite host) to man (intermediate host)."

The strategy of antimalarial treatment, whether by quinine alkaloids or the synthetic drugs atabrine and plasmochin, is a twofold attack with a suitable plasma poison on the life cycle of the causative organism, the Plasmodium: first, to eradicate in man the schizonts, or asexual forms, which produce the acute fever attack and thus to "cure" the patient; and, second, to

destroy the gametocytes, or sexual forms, which transmit the disease through infected mosquitoes.

At least three different species of Plasmodium produce malaria in man: (1) *P. vivax*, the cause of "benign" tertian malaria, which is widespread but has low mortality; (2) *P. falciparum*, the cause of malignant tertian, or estivo-autumnal, malaria, which is the most damaging form of the disease both as to incidence and as to severity of symptoms; and (3) *P. malariae*, the cause of quartan malaria, which is fairly rare but usually has a high mortality rate.

The two-phase development of the Plasmodium — i.e., the sexual form and the asexual form — occurs in two separate cycles in mosquito and in man, respectively, each having its own specific and individual characteristics. The sexual forms of the malaria parasites in the blood of a patient infect the mosquito; the asexual forms produce the clinical symptoms of the disease. When a susceptible female Anopheles mosquito of the proper species bites an infected individual and withdraws blood which contains a sufficient number of sex-ripe forms, reproduction takes place in the stomach of the mosquito. The muscular coat of the stomach is then penetrated by the structure resulting from the fusion of the male and female. This zygote finally lodges on the outer surface of the mosquito's stomach, where it grows rapidly and develops into a large oöcyst, which finally ruptures and releases many spindle-shaped young parasites (sporozoites) into the (Continued on page 190)



This four-year-old cinchona tree is a Guatemala-grown hybrid of quinine-rich *ledgeriana* and sturdy *succirubra*.

R. P. Lukens

Uncommon Clay

As More Is Learned about Its Basic Material Through the Application of Precise Techniques, Ceramics Becomes Science Rather Than Art

BY FREDERICK H. NORTON

CLAY is a unique material, widely and plentifully distributed in the earth's crust and endowed with properties that permit the easy fabrication of permanent articles having both utility and beauty. Therefore it is not strange that clay has been so intimately associated with the culture of mankind through his whole history.

Ever since prehistoric times, of course, clay has probably been the most generally used of the products man has taken from the earth's crust. As early as the Stone Age, clay in the dried condition was used for crude huts, for making rough cooking utensils, and for the primitive plastic arts. Gradually the method of treating it was refined until that superb product of the old Chinese potters was evolved — the exquisite hard porcelain which is so characteristic of their culture. Other regions have developed characteristic arts based on the use of clay; in fact, one of the chief means of indexing early civilizations from excavations is a study of their pottery.

In spite of this extensive use of clay, a real insight into the nature of the material itself has been possible only within the last few years. Even now many questions are unanswered and much is to be done before our knowledge will be complete. The reason for the slow progress is mainly the great difficulty in working with a material having a considerable proportion of the grains below the resolving power of the microscope. Not until recently have we been able, by means of x-ray diffraction patterns and photographs with the electron microscope, to get a really revealing picture of the nature of these fine particles.

At the present time, clay takes an important part in our war economy, partly because it is so abundant and readily available in a form requiring little or no purification and partly because it is the raw material for the manufacture of the refractories, insulating materials, and electrical porcelains which are so vitally connected with the production of war materials. Clay is also of interest as a source of alumina in the production of aluminum. As the supplies of the better bauxites become exhausted, we shall have to rely more and more on the purer clays for a raw material. The efficient extraction of alumina from clay depends on a sound knowledge of clay itself, so that the more or less fundamental studies now under way have real value in this branch of the war effort.

It is very difficult to define a clay in a way that will not necessitate numerous exceptions. The following definition, while rather broad, seems to be about the

best that can be devised at the present time: A clay is a hydrated, earthy material containing considerable alumina or silica and exhibiting the property of plasticity when wet.

The origin of clays is pretty well understood by the geologist. For the most part, they are produced by disintegration of a rock, usually a rock such as granite, containing a considerable proportion of feldspar. The character of the resulting clay depends not merely on the nature of the original rock but also on the type of disintegration process. Disintegration may occur by surface weathering, by percolation of ground waters, or by the action of gases deep below the surface. In general, the process leaches out the alkalies and reduces the amount of silica present, and consequently forms an entirely new hydrated mineral.

Clays may be classified in a number of different ways; it should be remembered that clay is normally an exceedingly variable material. A great many types occur, and even in one deposit a marked variation from one place to another may be noticeable. Geologists classify the clays broadly into two groups, residual and transported. Residual clays, so named because they are found in the same place where they were formed from the parent rock, include the residual kaolins, such as those in North Carolina, Vermont, and a few places in Massachusetts.

These residual clays ordinarily contain many undecomposed rock fragments in the form of sand, which has to be washed from the clay before it is used. After being washed, however, clays approaching most nearly to the theoretical composition are obtained. Transported clays are those which have been washed from their point of original formation and redeposited in a lake bed or bay, often undergoing some later alteration. They generally contain less sand and fewer rock fragments but vary a great deal, depending on the conditions under which they were laid down. Our brick clays, so common along the seacoast of New England, are transported clays derived originally from the rock dust of the glaciers during the Ice Age.

Clays may also be classified as to use: The kaolins, for instance, are white burning and are used for porcelain and pottery; fire clays, less pure, are used to make firebrick and other refractories; and ball clays, containing much organic material, are used in pottery. Among many others are brick clays, which are usually red burning, and stoneware clays. In order to give a rough idea of the great variation in our clays, chemical analyses of some typical ones are shown in Table 1.

TABLE 1. COMPOSITION OF TYPICAL CLAYS

	Washed Kaolin	Fire Clay	Diaspore Clay	Brick Clay
Silica.....	48.3	44.4	29.2	63.7
Alumina.....	37.6	37.1	53.3	18.3
Titanium dioxide.....	.....	1.8	2.7	.9
Ferric oxide.....	0.5	1.1	1.9	6.1
Calcium oxide.....	0.1	.6	.....	1.2
Magnesium oxide.....	.....	.2	.....	1.1
Alkalies.....	1.6	.7	.....	3.2
Combined water.....	12.0	12.9	12.0	5.0
	100.1	98.8	99.1	99.5

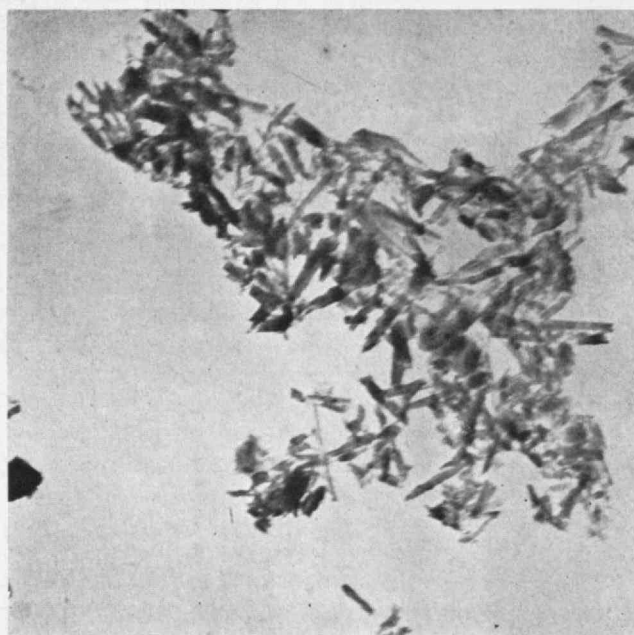
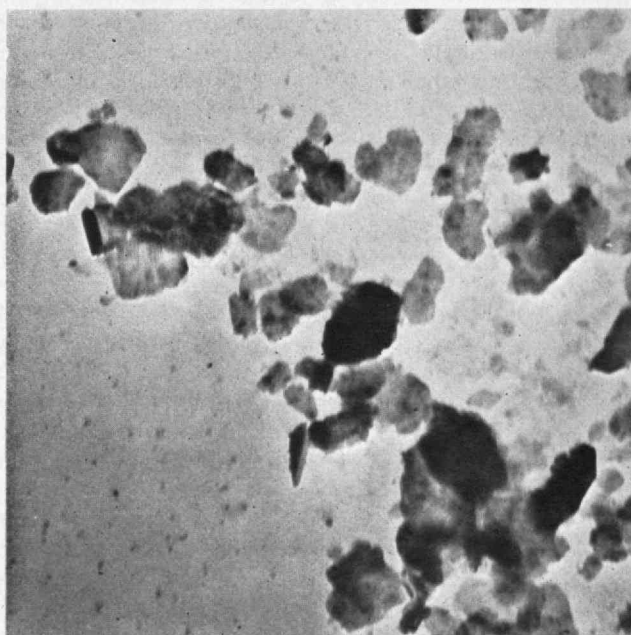
Let us examine more closely the nature of clay. It was formerly thought to be composed of coarser particles such as quartz, mica, and feldspar, and a finer substance which was believed to be a colloid or gluelike material having unique properties. Modern research, however, shows that the finer particles of the clay are still crystals but on a smaller scale and that the clay contains no gluelike substance whatsoever. The so-called clay minerals are those which make up the basic substance of the clays. By far the most common is kaolinite, although other associated minerals are often found. Kaolinite has the formula $(\text{OH})_4 \text{Al}_2\text{Si}_2\text{O}_5$. In the smaller sizes it occurs in thin hexagonal plates, which are believed derived from aggregates of the plates that originally formed "books" or "worms." Figure 1, taken with the electron microscope, shows on the left particles of kaolinite averaging about 0.3 micron in diameter, with the platelike, roughly hexagonal particles clearly evident. The worn and ragged appearance of the plates is characteristic of transported clays, whereas residual clays will have perfectly formed hexagonal plates. The other clay minerals — such as montmorillonite, illite,

and halloysite — while not so common as kaolinite, are frequently valuable in ceramic applications.

The identification of the various minerals in a clay is oftentimes important, but because of the fine grain size it is very difficult with the ordinary petrographic technique used by the mineralogist. X-ray diffraction patterns when taken on oriented grains will frequently serve to give a positive identification. The thermal analysis test, however, is often more nearly conclusive, for by this test the mineral is made to write its own signature. This result is accomplished through heating the clay mineral at a uniform rate in the furnace with a similar sample of inert material, such as fused alumina. At temperatures which drive the OH groups off the clay mineral, the temperature of the mineral will lag behind that of the neutral body and a temperature difference will be set up which can be readily recorded on a galvanometer. Moreover, other reactions in heating the clay, such as the crystallization of gamma alumina, produce heat, and these again are shown clearly on the record. Since each mineral has its own characteristic temperatures for these reactions, it is possible not only to identify the minerals present but also to get a quantitative measure of the amount of them in a mixture. Typical thermal curves of several clay minerals are shown in Fig. 2, page 184.

The shape of the clay particles is very characteristic, the thickness of the plates being about $\frac{1}{10}$ their diameter, as can be seen quite clearly in Fig. 1, left, in which the overlapping transparent plates are evident. Of course, some of the clay minerals are not so platelike as the kaolinite; halloysite, for example, consists of rodlike crystals (see Fig. 1, right).

The sizes of clay particles are also important and characteristic. Hence Fig. 3, which shows the range of sizes of particles for two clays, is of no small interest.



Leo J. Sullivan, '40

Fig. 1. Clay particles give up some of their secrets in these photographs made with the electron microscope constructed in the Department of Physics at the Institute by George G. Harvey, Assistant Professor of Physics, and Leo J. Sullivan, '40, Research Assistant. On the left are shown particles of light English ball clay from .2 to .4 micron in diameter; on the right, the rodlike crystals of the clay mineral, halloysite. Magnification, 17,000x.

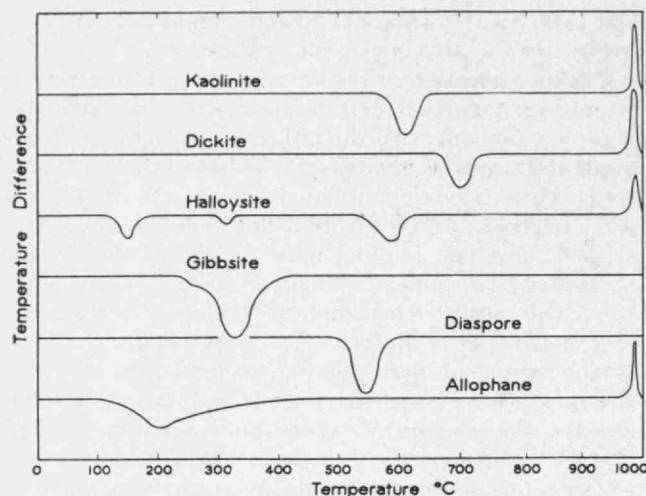


Fig. 2

The most frequent particle diameter is between .5 and 1 micron. Few particles are found below 0.1 micron except in the bentonites, and particles above 5 microns are not common, so that clay has the unique property among minerals of possessing a rather uniform grain size. This characteristic is closely connected with the plastic properties of the substance.

The high degree of plasticity which results when clay is mixed with the right proportion of water is perhaps its most striking property. The plasticity of clays varies a great deal—some, like the ball clays, are sticky and highly plastic; some, like the sandy clays, show scarcely any plasticity at all. The clays that are commonly used, however, have a considerable degree of plasticity.

A plastic material may be defined as one which will deform only when the deforming force exceeds a certain minimum value, and which, after the removal of the force, will not come back to its original shape. This question of plasticity of clay and water can perhaps be made clear by reference to Fig. 4, in which are plotted the relative volumes of clay, water, and air for various ratios of clay-to-water mixtures. As the quantity of water is increased, it gradually fills up spaces between the clay particles and reduces the amount of air until a certain point, *A*, is reached where

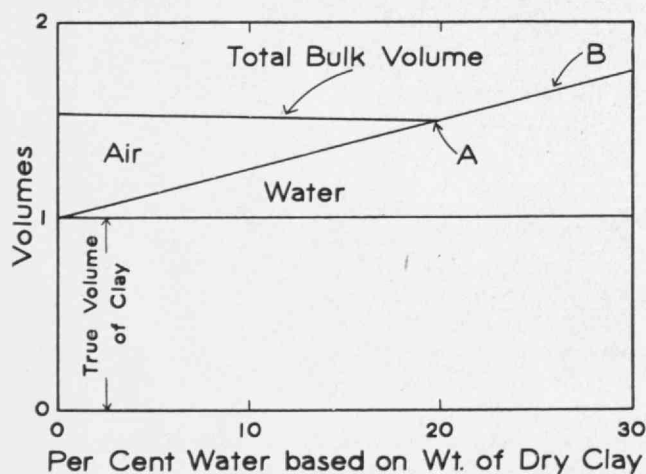


Fig. 4

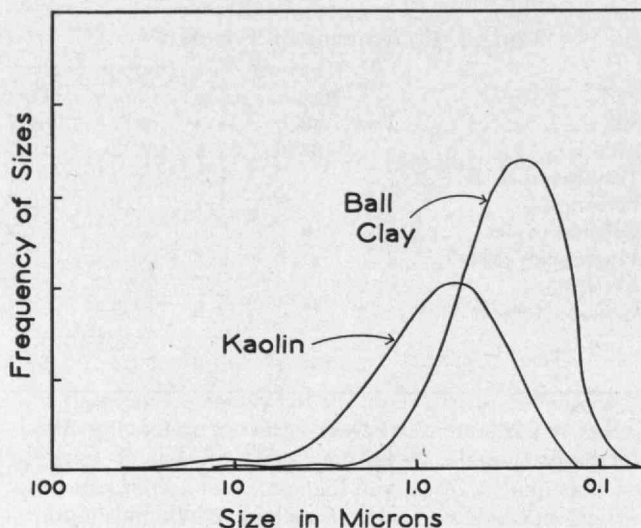


Fig. 3

all the air is displaced and a simple clay-water system results. The total volume of the mass is slightly decreased by this process, because of the fact that water acts as a lubricant and permits the particles to orient themselves into the most favorable conditions for close packing.

As more water is added beyond point *A*, the bulk volume will naturally increase; the particles are slowly separated by a water film which, with the increase of water, grows thicker and thicker until the saturation point, *B*, is reached, representing the maximum stable thickness of water film at the particular molding pressure employed. These water films are very thin—only about .000002 millimeter, or 20 water molecules. Should we apply a higher pressure of molding, the stable thickness would be decreased. The plastic range of the clay, then, is between the points *A* and *B*, where a homogeneous plastic mass exists, becoming more and more readily deformed as point *B* is reached. In the whole range, however, the important characteristic of the material is that it has a definite yield point which must be exceeded before flow can be started.

Many questions still remain to be solved concerning the reasons for plasticity in this system; the answers seem to be mainly connected with the presence of plate-like particles having large, relatively flat surfaces which can hold a stable water film between them because of the surface activity of the hydrated clay mineral. Unless these stable water films can be built up, the property of plasticity cannot be developed. For example, a mineral such as quartz, which has no definite cleavage, has entirely different characteristics and is quite lacking in yield point when produced in the same grain size as the clays.

When a plastic clay mass is dried, a decrease in volume is always obtained. This shrinkage has to be very carefully considered in any manufacture of clay products, or strains will be set up sufficient to cause cracks. The cause of the shrinkage is very readily understood in view of the fact that clay in a moist condition has fine particles separated by water films. In drying, the reduction in bulk volume is exactly equal to the volume of water that is lost, a fact which (Continued on page 192)

Unconscious Ambassadors

Relationships between Nations Can Be No More Than the Sum of Those between Individuals

BY BERTHA S. W. DODGE

THE long look in international relations was never more needed than now when most of us are preoccupied with the immediate concerns of a warring world. The article by Robert G. Caldwell in *The Review* for November ably directed attention to the fact that the attitude of people toward each other is a matter of primary importance in determining the relationships of states with each other. Dr. Caldwell wrote with the authority his past experience and present position warrant. May I add to his my own humble testimony, the outgrowth of experience in American lands to the southward. The guinea pig which knows nothing of the theory of immunity may yet add to general knowledge of the subject.

I wouldn't presume to claim that I really know Central America. I am in the uncertain position of having lived there either too long or too little to write a book about it. Many a chatty, amusing, slightly informative book has come from the pen of a few weeks' resident in a country with tourist appeal. A very occasional profound study has come from a resident of decades' standing. What may I offer, who have lived in Central America in all slightly less than three years? The answer is, of course, very little indeed.

Still, I do have certain advantages: travel with my scientist husband to distant and obscure outposts where accommodations would make the average tourist shudder — this in search of plants for botanical collections; acquaintance with many cultured Central Americans because of our avowed interest in their history, their culture, and their educational institutions, as demonstrated by our sending our daughters to native schools; perspective on our own citizens in such countries as we have lived in because we have come to know them to a certain degree and, knowing some of the Central Americans well, have come to learn of the impact of our own compatriots on them. To these general qualifications for criticism should be added a fourth and more specific one — 18 months' residence in Guatemala as the wife of the United States exchange professor sent by our State Department under the Buenos Aires Convention.

It is superfluous to recall that in the past both our national and our individual relationships with Latin America have not been entirely to our credit. There was a time indeed when outcasts and adventurers formed the bulk of our unofficial representatives in Latin America, which judged all of us accordingly.

Now that we have come to put a value on the opinions of our neighbors to the southward, we should acknowledge readily enough that such a situation was unfortunate in the extreme. And yet, to me, many of

those adventurers were more desirable than some of the more conventional representatives by whose ways we are now often judged and found wanting. The adventurer had a certain swashbuckling quality that often made him find a real place in the life of those frontier communities where he usually thought it safest to hide himself. Often he took unto himself a native wife, mastered the native tongue, and raised a family of native children that helped him fit smoothly into his background. One still meets such folk in frontier outposts — elderly Americans who are hospitable to the point of embarrassing their guests, whose pathetic eagerness to hear their native tongue once more does not change the fact that they can rarely complete a sentence without calling in some Spanish phrase to express their ideas. Such dealings as one of these expatriates may have with government officials, he undertakes with that bland, unhurried suavity that nowadays so few will trouble to master. Usually he thoroughly understands the frontier psychology of the surrounding peon population which, in turn, respects him.

Some others among our present residents in Latin America, however, do not thus fit into their background. These who do not are marked by the unfortunate psychology of a rootless society that has no real place either in the country where it flourishes or in the land of origin of its members. Such a society as these maladjusted ones constitute exists in a sort of social vacuum where contacts and intellectual opportunities are limited not by the real conditions of the land but by a sort of self-protective instinct of its members who, even when they may live in the capital cities, resist with the steely conservatism of an isolated small town all contacts with their alien environment.

I believe that it may be as ridiculous to expect the leopard to change his spots as to expect these unconscious ambassadors to change their ways once they have entered a tropical community. In this I do not mean to be too harsh on the individual, for I understand that the bewildered newcomer has no basis on which to judge his compatriots and that the subsequent breaking away involves an isolation very difficult to face.

The men, in general, have positions that pay them more than similar ones at home. The climate is in most circumstances more than barely endurable if one learns to live according to its demands. Unfortunately, though, the traditional tropical troubles of too freely flowing liquor and money have undermined the health and pocketbooks of some men who, returning home, find it less embarrassing to throw all the blame on the climate.

As a woman, I shall take the perennial liberty of criticizing my own sex. The women are, I think, largely responsible for the unfortunate situation and attitude of that part of our representation in Latin America on which adverse judgments are based. Most of them are average American housewives with a history behind them of an average home, modestly furnished, well equipped with labor-saving devices, and possibly lacking a maid entirely. At home such a woman has done much of her own work, taken care of her own children, and bought car and furniture on the installment plan. Then she goes to the tropics, where labor is cheap and furniture of the finest tropical woods may be made to her order. So she gets not one maid but three or four, because Mrs. Jones, who has lived in the community 20 years, says one cannot maintain any social position without such help. The less thought our newcomer has given to such matters at home, the more she becomes afraid she may betray her ignorance and unworthiness. So, under the guidance of Mrs. Jones, who thus relieves her own boredom, she hires maids, has her clothes made for almost nothing by nimble-fingered native sewing girls, and orders made-to-measure furniture of a sort her wealthiest neighbor could not have afforded at home. And when her car comes, usually at the expense of her husband's employer, her social position is assured — for few native sons can afford a car, in view of the high transportation costs and terrific import duties. Thus, suddenly, our average American housewife finds herself with a tremendously inflated social position and nothing at all to do.

This, then, is the tragedy both for her personally and for the country of which, whether she so wills it or not, she is regarded as representative. She might use some of her time to learn the language of the country of residence, but Mrs. Jones after 20 years of residence still has difficulty in making her maids understand her, and Mrs. J. is someone in the community. Some day, she explains, she may manage to find time to study a bit of Spanish just to make those stupid maids understand a bit better. It would be fun to deprive them of that perennial excuse, "But I did not understand the *señora*."

That they should learn Spanish because it is the language of the land that is supporting them in such regal luxury would never occur to people like Mrs. Jones and her disciples. That there is a native literature that might thus be opened up to them, that they might come to know the cultured as well as the servant classes, might learn a bit of the history that is older than ours and of the social problems that spring from that history, might put themselves in a position to make some personal contribution — all these impulses they would hastily disown as slightly discreditable. For they have learned to pronounce the word "native" with a peculiarly arrogant condescension that makes even the servants quiver with indignation. I have heard this matter commented on by cultured native friends, but with such apology for their criticism of countrymen of mine that I have blushed in shame.

Life in the tropics is said to be terribly trying. Well, I have lived in the tropics, though never in circumstances of such planned comfort as most of my com-

patriots. I have helped collect plants anywhere from lowland jungles to high cold uplands where the wind that blows between the worlds sweeps about one mercilessly. I have experienced indescribable frontier *fincas* and primitive hostelry. And I maintain that the most dangerous aspects of life in the tropics are indolence and self-pity. From these spring most of the discontent and the indispositions that sometimes make life in tropical communities so far less happy than it should be.

This is not a sales talk for tropical employment, which is, I believe, often entered upon too lightly. This is simply a justification for criticism of some compatriots who behave unpardonably and thus may place in grave peril many whom they have never known. In these days of generalization we are too prone to forget that any relationship between nations can, at best, be no more than the sum of individual relationships and can be no more successful than those individual relationships. At worst, we may find that a conspicuous breach of morals or faith on the part of one or a few private individuals may endanger the relationships of nations.

I have come to the conclusion that the cultural approach in international relations is, in the long run, bound to be the most successful and enduring. Slower it may be, as all enduring structures are of slow and painstaking construction if they are to withstand the assaults of time. But there can be no permanent basis for international understanding when culture is ignored. If, as a result of further personal observations, I have come to the conclusion that cultural relations are best not explicitly conducted as a function of our State Department, I still must applaud the vision and tirelessness of the members of this department who have recognized the need for cultural *rapprochement* and who have worked always toward that end.

To begin with the obvious, there is something faintly humorous in deliberately labeling a representative as "cultural." Does it suggest that we take no official responsibility for the cultural attainments of other representatives? Be sure that if we disown this implication, it still will not be wasted on the ready wits of our southern neighbors. Nor will any impartial observer blame them for their smiles.

Education our diplomats must all have, to a greater or lesser degree, but that indefinable something called culture is often woefully lacked by career men and political appointees alike. And this lack becomes more conspicuous for the fact that the Latin American public servants in general come from the really cultured classes. Many of them are doctors, historians, essayists, or poets of note. Yet it often happens that our own representatives are so wanting in linguistic ability that they may have to call on representatives of the governments they are dealing with to interpret for them. When, then, we send a special assistant in cultural relations, it looks too often like a confession of failure.

Let me hasten to assert that I know such an assistant is supposed to discharge special duties, for which he is presumably specially equipped and with which the higher-ups in the legations are too busy to deal. He deals, for instance, with scholars (*Continued on page 194*)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Around the Year

TECHNOLOGY will go on a year-round academic schedule beginning in June of this year, in order to adjust its work to the plans set up for the quicker training of college men by the Army, the Navy, and the War Manpower Commission. The Class of 1943, which was graduated on February 1, had been on an accelerated schedule since last June.

The new schedule, comparably accelerating the work of the other three present classes, is expected to become effective with the beginning on Monday, June 7, of the first term of a new three-term scheme of operation. The first semester will extend through Friday, September 24. The second term will begin on Monday, October 4, continuing through Friday, January 28, 1944. Monday, February 7, 1944, will see the opening of the third term, which will end on Friday, May 26, 1944. The three semesters thus established will consist of 16 weeks each and will be separated by vacation periods of 10 days. Since two semesters will continue to constitute an academic year as they have in the past, each calendar year under the new plan will include one and one-half academic years.

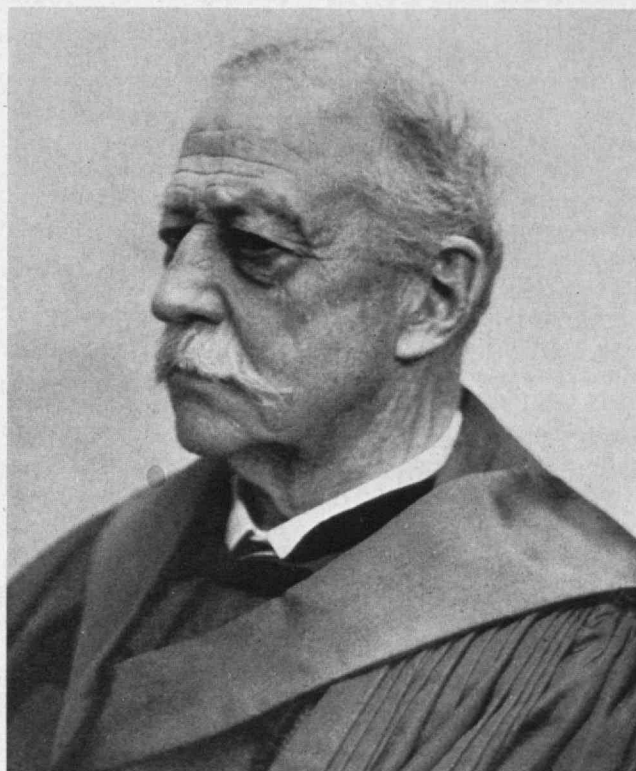
This year's freshman class will begin its work on June 7, and the Institute may or may not admit additional units of the freshman class in October and February. The decision will depend upon the number of qualified applicants for admission on these dates and upon the extent to which facilities may be available for such additional groups in view of the special Army, Navy, and War Manpower Commission programs that may be in progress at that time.

Commenting on the new arrangement, President Compton stated that there is a widespread demand for admission of freshmen in June in order that graduates of high and preparatory schools may proceed as far as possible with their collegiate educational programs before they are called for service in the armed forces.

Under the new accelerated schedule, the present undergraduate classes will continue their educational program on the three-semester basis. Thus the sophomore, junior, and senior classes, in so far as they are permitted to continue their formal education, will proceed with their work on June 7, when the incoming freshman class will begin operation.

The Institute's program of postgraduate instruction will also be adjusted by changes in the scheduling and in the distribution of special graduate courses in order to meet as fully as possible the needs for a satisfactory continuous program.

Technology's teaching staff will be on duty during any two of the three terms or for all terms, depending upon the necessities of the situation as they develop in accordance with directions in which the institution may be called upon to participate in government programs.



A. Lawrence Lowell

Sherry

Abbott Lawrence Lowell, 1856-1943

SENIOR life member of the Corporation of the Institute, with which his family had long been associated, A. Lawrence Lowell, President Emeritus of Harvard University, died at his home in Boston on January 6. A graduate of Harvard in 1877 and of its law school in 1880, he had engaged in the practice of law in Boston for 17 years when he was called back to Harvard, where he was to serve as professor of the science of government for nine years. The university then was prospering under the administration of Charles W. Eliot, to whom Dr. Lowell was an able adjutant. Upon the retirement of President Eliot after 40 years of duty, Dr. Lowell in 1909 became the university's twenty-fourth president. During the 24 years of his presidency, with great expansion of its physical plant, increase in enrollment, augmentation of endowment, adoption of the tutorial system, initiation of the plan of general examinations, establishment of the house plan for the domiciling of students, inauguration of the Society of Fellows, and revision of admission rules, Harvard attained even greater usefulness and prestige.

During his notable career, Dr. Lowell had maintained intimate concern for Technology, as President Compton pointed out in a statement at the time of Dr. Lowell's death: "The death of Dr. Lowell is a great loss to the

Institute, on the Corporation of which he had served with distinction since 1896. He was the third generation of his family to hold membership on the Corporation. His father, Augustus Lowell; his grandfather, John A. Lowell, who was vice-president of Technology from 1862 to 1870; and his brother, Percival Lowell, were influential in shaping the course of the Institute through the early years of its history.

"Dr. Lowell had served on the Executive Committee of the Institute some years before he was appointed president of Harvard University. His service as a member of the Corporation was particularly valuable during the years of the Institute's expansion following the gift of endowment funds by George Eastman. Recently he had been most active as a member of the Corporation Visiting Committees on Student Activity and on English and History. Out of the rich experience of his career as an educator came a great deal of wise counsel which was most helpful to all of us, who greatly valued his close association with the Institute's administration. In 1899 and 1900, Dr. Lowell and his father each presented the Institute with substantial funds to be used in case of retirement and death of members of the Faculty.

"As sole trustee of the Lowell Institute School, which is conducted at Technology, Dr. Lowell took special interest in the technical education of young men in industry."

Not only as an educator and college administrator but also as a thoughtful and public-spirited citizen, Dr. Lowell led a distinguished life. From arguing for a League of Nations in debate with Senator Henry Cabot Lodge to studying the social effect of motion pictures on children, from early advocacy of economic boycotting of Japan because of aggression in China to frequent appearances at legislative hearings on bills of public moment, he was vigorous in the interests of good government and public welfare. An undergraduate who as a student won honors in mathematics and membership in Phi Beta Kappa and who as a star middle-distance runner was first in both a half-mile and a one-mile race in the same afternoon, he went on to exemplify in himself and to seek for others the full and well-rounded life.

More Than a Mile

THE Institute has recently purchased from John D. Rockefeller, Jr., the land and buildings east of the President's House on Memorial Drive, extending through to Amherst Street — a total of 139,000 square feet. This addition increases the Institute frontage on the Charles River by more than 500 feet, making its over-all length more than a full mile. Mr. Rockefeller purchased this land about 20 years ago for the building of an international student house, but plans for the project had been given up for some time past.

Alumni of the 1915-1920 days will recall the so-called Shoe and Leather Exposition Building on this site. Remnants of this building, together with not too attractive later additions, still mar the Cambridge side of the river. The Institute has no immediate use — either warwise or otherwise — for this property but has secured it for possible postwar development.

For Better Cities

ESTABLISHMENT of an urban redevelopment field station at the Institute by the Course in City Planning, made possible by a grant of funds from the Albert Farwell Bemis Foundation, further implements the research work being done by the Course in problems of making cities better places for living. One of the important questions now being investigated by the field station is that of the rehabilitation of urban residential areas where the existing buildings are in sound structural and sanitary condition but where the neighborhood pattern is obsolete. Capital and operating costs needed to bring the environmental conditions in such areas up to modern standards are being prepared, particularly in respect to the planning of the local street system and the adequacy of parks, playgrounds, and other community facilities. Studies are also being made of changes which might be necessary or desirable in fiscal or administrative policy of local government, were such a program carried out on a city-wide basis. Increases in the proportion of tax-exempt property and in the costs of maintenance and supervision for a greatly augmented program of neighborhood recreation must be reckoned with.

Associated in the direction of the new field station's research program are Frederick J. Adams, Associate Professor of City Planning and in charge of the Institute's Course in City Planning; Philip H. Cornick of the Institute of Public Administration, New York; and Edwin H. Spengler, associate professor of economics at Brooklyn College and consultant to the National Resources Planning Board. Among the co-operating agencies are the City Planning Board of Boston, which has made available to the research group its excellent data on physical, economic, and social conditions in Boston, and the American Public Health Association's committee on the hygiene of housing, of which Dr. C.-E. A. Winslow, '98, of Yale University is chairman.

Visiting Committee Report

WORK of the Department of Naval Architecture and Marine Engineering is surveyed in the report of the Corporation Visiting Committee * for that Department, which follows:

A meeting of the Committee and the members of the staff of the Department was held at the Institute on October 14. The total enrollment in the courses in this Department for 1942 amounted to 7.8 per cent of all Technology students, excluding freshmen. This year the Department is the fourth largest in the Institute. That this is a temporary condition is recognized by the Committee and by the staff. The foreign registration in Courses XIII and XIII-A continues.

The rapid expansion in shipbuilding in the United States and the active entrance of this country into the present World War have resulted in a demand for our graduates that has far exceeded the supply. Most of

* Members of the Committee for 1942-1943 are Joseph W. Powell, Chairman, Emory S. Land, '07, Charles Edison, '13, H. B. Richmond, '14, Charles L. Brand, '15, Richard R. Adams, '18, and George B. Connard, '25.

the graduates who could comply with the physical standards set by the Navy Department have accepted commissions in the Naval Reserve. The 23 graduates in 1942 were distributed as follows: 8 to the Army, 1 to the Navy, and 14 to eight shipbuilding or ship designing organizations. The shipbuilding program is now nearing its peak because of limitations of material and personnel. The demands of the armed services will absorb the present students, but there may be a decrease in the enrollment in the special courses in the near future.

Some modifications in the subjects in Course XIII and some variation in the length of the Course have been made, but, in general, the net result has not affected the thorough training required for graduation.

The present academic year is the first in which all XIII-A students will take the combined Course in Naval Construction and Engineering, and it is also the first year that will see the graduation of a class in XIII-A who have taken that combined Course. The difference of opinion as to the advisability of this Course remains unchanged, and the work of the graduates in their profession will be closely watched to determine as far as may be whether or not the combined Course turns out as satisfactory a product as the previous more distinctive courses for naval construction and marine engineering. This is the last year of the distinct Naval Engineering Course. The last year of the Naval Construction Course for the United States Navy was completed with the graduation of the 1942 class in October, 1941. It is interesting to note that since the inauguration of the Course in Naval Construction in 1901, 329 officers of the Navy have been assigned to this institution, and the courses for these officers have now covered a period of over 40 years.

The Course in Marine Transportation continues to serve a very valuable purpose in the provision of trained men for the steamship companies. Since the war, because

of the physical risks involved, it has not been considered advisable to continue the practice of having the men spend a year at sea. The value of this experience has, however, been thoroughly demonstrated, and this feature of the Course will be restored as soon as conditions permit. It is recommended that arrangements be made for the students in this Course to spend one or two summers on ships on the Great Lakes. While this would have been difficult in normal times, it is believed that by next summer the shortage of personnel will be so acute that the steamship companies will welcome the opportunity to avail themselves of the services of the young men in this Course. The distribution of and the work done by the graduates is most commendable. The record of their advancement in their chosen profession is excellent, and their distribution among 14 steamship companies, the Army, the Navy, the Maritime Commission, and other activities thoroughly justifies the time and expense that the Institute has given to the development of the Course.

The stress of circumstances has prevented any development of an advanced course in Naval Architecture leading to a degree of master of science. Facilities are available at the Institute, however, to permit it to offer a highly satisfactory course in this field.

The use of the flume in the Department of Mechanical Engineering as a model-towing tank has been continued. This is far from satisfactory, and a small towing tank is a crying need to complete the facilities that should be available to this Department. Professor Frank M. Lewis reported that the propeller-testing tunnel has been in continuous operation and has achieved a number of very remarkable results. The Committee saw this tunnel in operation and were much impressed by the possible improvements in propeller design that should eventuate from the data that will be forthcoming from it. The method of casting small propellers that has been developed under Professor Lewis (*Concluded on page 205*)

The M.I.T. Club of Buenos Aires collaborates in a renewal of youth. From the top: Casimiro Lana-Sarrate, '18, Enrique de Souza, '23, Luciano A. Preloran, '22, Roberto J. Ottonello, '22, Walter D. Siddall, '25, Jose G. Amaro, '25, Victor J. Decorte, '28, Francisco Ravecca, Jr., '23, Marcelo J. Markous, '39, Francisco Danieri, Henry C. Rickard, '26, Carlos Young-Fulton, '26, Richard W. Plummer, '26, and Luis A. Artola, '22.



ANTIMALARIAL AMMUNITION

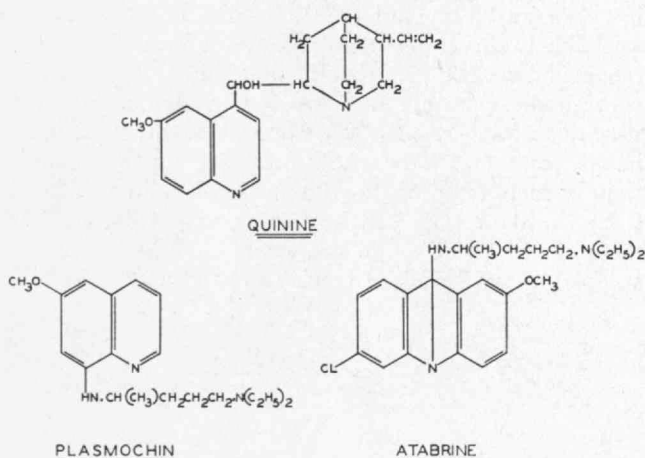
(Continued from page 181)

abdominal cavity. From there, some of them find their way to the mosquito's salivary gland, later to be introduced into the blood of man.

When the infected mosquito through its bite introduces the young malarial parasites into the blood of man, they enter the red blood cells where, by various stages, they grow, reproduce, and divide until the blood cells break up and release the spores to repeat the cycle again. *P. vivax*, *P. falciparum*, and *P. malariae* all have similar life cycles in the blood. Malaria parasites are demonstrable under microscopic examination of fresh or stained blood films. Their presence is infallible evidence of malaria.

As previously pointed out, the "ammunition" for the destruction of the malaria parasite must be a plasma poison, quinine being the classical example. In designing new synthetic antimalarials, organic chemists were guided by the molecular configuration of quinine itself. The kinship between quinine and its associated natural alkaloids, on the one hand, and the synthetic antimalarials atabrine and plasmochin, on the other, is apparent from the structural formulas.

QUININE AND QUININE SUBSTITUTES



The structural relationship among quinine and the synthetics atabrine and plasmochin is revealed by their chemical formulas.

Quinine consists of a quinoline ring containing a methoxy group in position (6) and linked to a piperidine nucleus having a vinyl side chain and an "inner" CH_2-CH_2 bridge. Dosages vary according to type of malaria, degree of severity or infection, and other attending circumstances. The so-called short quinine treatment has recently become more widely accepted. It provides for a daily dose of 20 grains of quinine sulphate for five to seven days. If a relapse occurs, the same treatment is repeated. Smaller prophylactic doses are given over a period of weeks. The mild toxic by-effects of quinine — ringing of the ears — give early warning of overdosage. This is of value in self-treatment.

Quinidine has the same molecular composition as quinine, of which it is a stereoisomer. Cinchonine differs structurally from quinine in that it lacks the methoxy

group (CH_3O) on the quinoline nucleus. Cinchonidine is a stereoisomer of cinchonine, which it equals in therapeutic efficacy.

These three cinchona by-alkaloids — quinidine, cinchonine, and cinchonidine — which, with quinine, constitute the antimalarial preparation totaquine, previously described, differ from quinine in therapeutic effect to varying degrees. Cinchonine and cinchonidine generally are regarded as about one-third as potent as quinine, whereas quinidine is said to approach the latter closely in antimalarial action. Recent pharmacologic studies of the plasmodicidal value of the by-alkaloids, however, seem to indicate their practical equivalence with quinine in this respect, thus supporting the rationale of totaquine therapy.

No practical synthesis of the four crystallizable cinchona alkaloids has been perfected as yet.

Of the synthetic antimalarials, plasmochin, like quinine, is a substituted 6-methoxy quinoline, having a methyl-diethylaminobutylamino side chain in position (8). Because of their chemical similarity, plasmochin was expected to approach quinine in plasmodicidal value. While it proved somewhat disappointing in its curative action, it showed unexpected power of destruction of the sexual forms of the *Plasmodium* which spread the disease. For this reason plasmochin is important in the control of malaria through the inactivation of malaria carriers.

Atabrine is a substituted methoxy-acridine. Although more distantly related structurally to quinine than is plasmochin, atabrine has proved its effectiveness as an antimalarial, both therapeutically and as a suppressive. The subcommittee on tropical diseases of the National Research Council endorses the atabrine treatment as an efficient routine of malarial therapy. The usual dosage is three tablets of 0.1 gram for five to seven days — a course very similar to the short quinine treatment. The price of the drug has been reduced to a point where the cost of treatment compares favorably with that of quinine at former market levels. A plentiful supply of atabrine is of great comfort to the United Nations, because it stretches the limited available supplies of natural quinine.

The battle against malaria is not permitted to rest on the assurance of adequate supplies of atabrine and plasmochin while the world waits hopefully for the production of cinchona in the Western Hemisphere. Search for new antimalarials, both natural and synthetic, is being pursued energetically by a number of American research workers. The pharmacologic evaluation of the intrinsic efficacy of these new substances is a painstaking and hazardous task, and only very few research laboratories are qualified for this type of work, which involves the use of infected mosquitoes for transmittal of the *Plasmodium*. Animals infected with the organism of *P. cathemerium* (canary malaria), *P. lophurae* (duck malaria), or *P. gallinaceum* (chick malaria) are employed in these tests.

Out of the studies may come the "ideal" antimalarial drug, one that will rid the human body of the malaria parasite so completely that further transmission of the disease by the *Anopheles* mosquito is nullified. This

(Concluded on page 192)



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ANTIMALARIAL AMMUNITION

(Concluded from page 190)

discovery might then bring to fulfillment the dream of Commander Thomas M. Rivers, former director of the Rockefeller Institute Hospital, to free the world of human malaria without disturbing mosquitoes. Such a scheme would seem to be more feasible than the eradication of the malaria-bearing mosquitoes by world-wide sanitary control.

Our present position may be summarized thus: Quinine is still the best-known treatment of malaria. Stocks are limited, but production in the Western Hemisphere is coming along. In addition, we have atabrine, of equal therapeutic value and manufactured in the United States on a huge scale. The annual capacity of the two American producers of atabrine is in excess of 700,000,000 tablets, and production eventually will reach the billion mark. These billion tablets will be practically equivalent in therapeutic effect to the world's former production of quinine — over 20,000,000 ounces. Plasmochin, the drug which sterilizes the malaria carrier and is also synthetic, is plentiful. The shortage of quinine for the use of the civilian population is relieved by totaquine, which is obtainable from low-grade South American barks that are not suitable for the economic production of quinine sulphate.

UNCOMMON CLAY

(Continued from page 184)

simply means that the water films gradually decrease in thickness and the particles get closer and closer together until a point is reached where they actually touch. Beyond this point no change in volume occurs, and the water removed is simply that which lies in the pores between the particles. This phenomenon is well illustrated in Fig. 5 by the shrinkage curve for a typical clay. Note that the shrinkage curve has a 45-degree slope until *A* is reached, after which no further change in volume takes place although much water still remains.

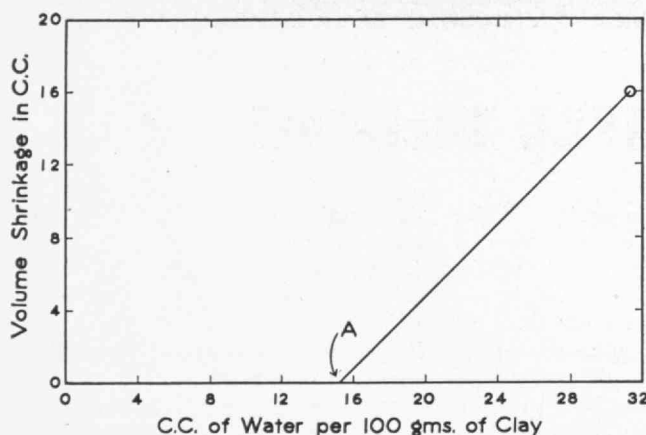


Fig. 5

After the clay is dried, it has considerable strength, some clays being much stronger than others. It is this property of strength after being dried which permits ware formed from clay to be handled; if it were made out of nearly any other mineral, it would have no dried

strength. Very little is known about the cause of the dried strength of clays. We can only infer that between the particles are attractive forces of sufficient magnitude to give this strength.

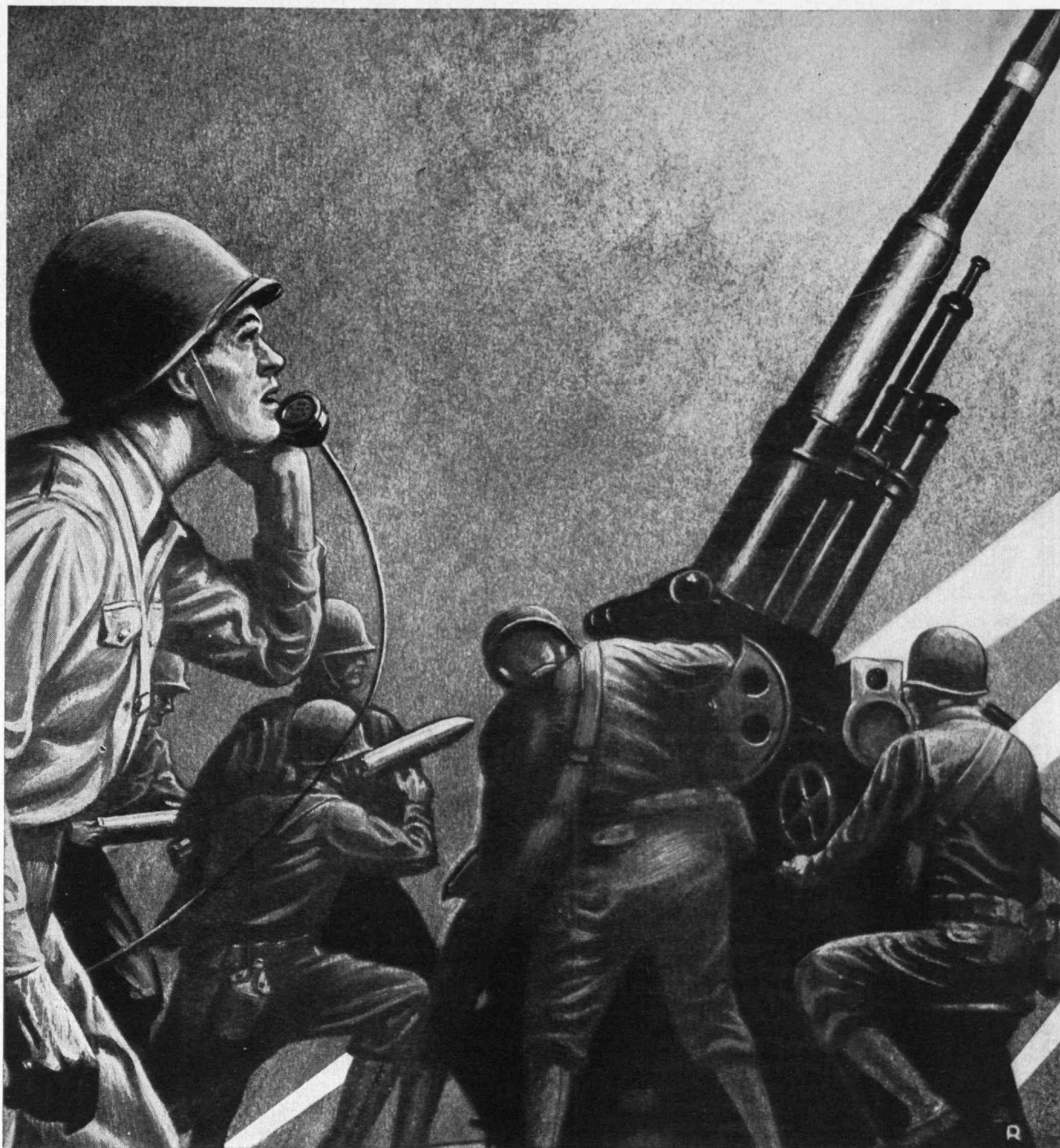
After being dried, clays can be fired and transformed into a permanent rigid structure, which is the basis for our ceramic products. The clays vary a great deal in their burning properties, some firing to a pure white color, some firing buff, and some firing red. Certain clays — brick clays, for example — contain enough impurities or fluxing materials to permit firing at a comparatively low temperature, whereas the purer fire clays must be heated to a very high temperature in order to obtain the strength and other physical properties desired. In the making of pottery and porcelain, clay alone is seldom used because it would have too much shrinkage and would require too high a temperature for firing. Therefore, feldspar and quartz are usually added, the feldspar acting as a flux to tie the mass together and the quartz acting as a skeleton to hold the volume more nearly constant during the drying and firing. Most clays shrink to some extent in firing, and this shrinkage must be carefully controlled if an article with the desired final dimensions is to be produced.

The reactions occurring in the clay during the firing process are complex and are not completely understood at the present time. Yet several definite reactions occur of which we are more or less certain. For instance, when a crystal of kaolinite is heated, no appreciable change happens until the temperature of about red heat is reached, at which time the crystal is broken up and the chemically combined water is driven off. This reaction takes place at a fairly definite temperature and absorbs considerable heat, as is shown by the thermal curves in Fig. 2. Above this temperature the material seems to be in somewhat of an amorphous form, the x-ray indicating little or no crystallization. The structure cannot be completely disrupted, however, as the chemically combined water can be replaced by treatment of the dehydrated clay with high-pressure steam. On the other hand, if the temperature is allowed to go above 1,000 degrees Centigrade, the water cannot be readily replaced because a sudden crystallization of alumina occurs at this temperature, after which the alumina decomposes into glass and mullite, the latter being the stable high-temperature phase of all aluminum silicates. The formation of alumina is shown quite clearly on the thermal curves by the sharp peak at 980 degrees Centigrade, indicating an evolution of heat. At still higher temperatures, more and more glass is formed, which tends to pull the clay particles together by capillary attraction and thus cause the so-called firing shrinkage present in nearly all clays. When the temperature has become high enough to form a complete glass, the softening point has been reached and the mass will readily deform.

This process is, of course, modified to a considerable extent if impurities are present. For example, iron minerals in many of the dark-burning clays produce glass at a comparatively low temperature and thus limit the use of those clays to rather low-fired building products. Many clays also contain organic matter which, unless thoroughly oxidized in the early stages of the firing, will

(Concluded on page 194)

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- Helium-Oxygen Mixture
- Oxygen-Carbon Dioxide Mixture
- Nitrous Oxide
- Carbon Dioxide

**UNCOMMON CLAY***(Concluded from page 192)*

remain in the center of the fired article and produce black cores. Other clays contain sulphides that decompose and produce sulphur dioxide, which may later combine with the water vapor and the flue gases, deposit on the surface of the ware, and produce a particularly undesirable white scum.

The uses of clay are many and closely associated both directly and indirectly with our daily lives: Our dishes, bricks, tile floors, electrical fixtures, plumbing fixtures, and tile drains are things essential to every home. In addition, the production of electricity, gas, and all the metals is dependent on clays for refractory brick to resist the high temperatures.

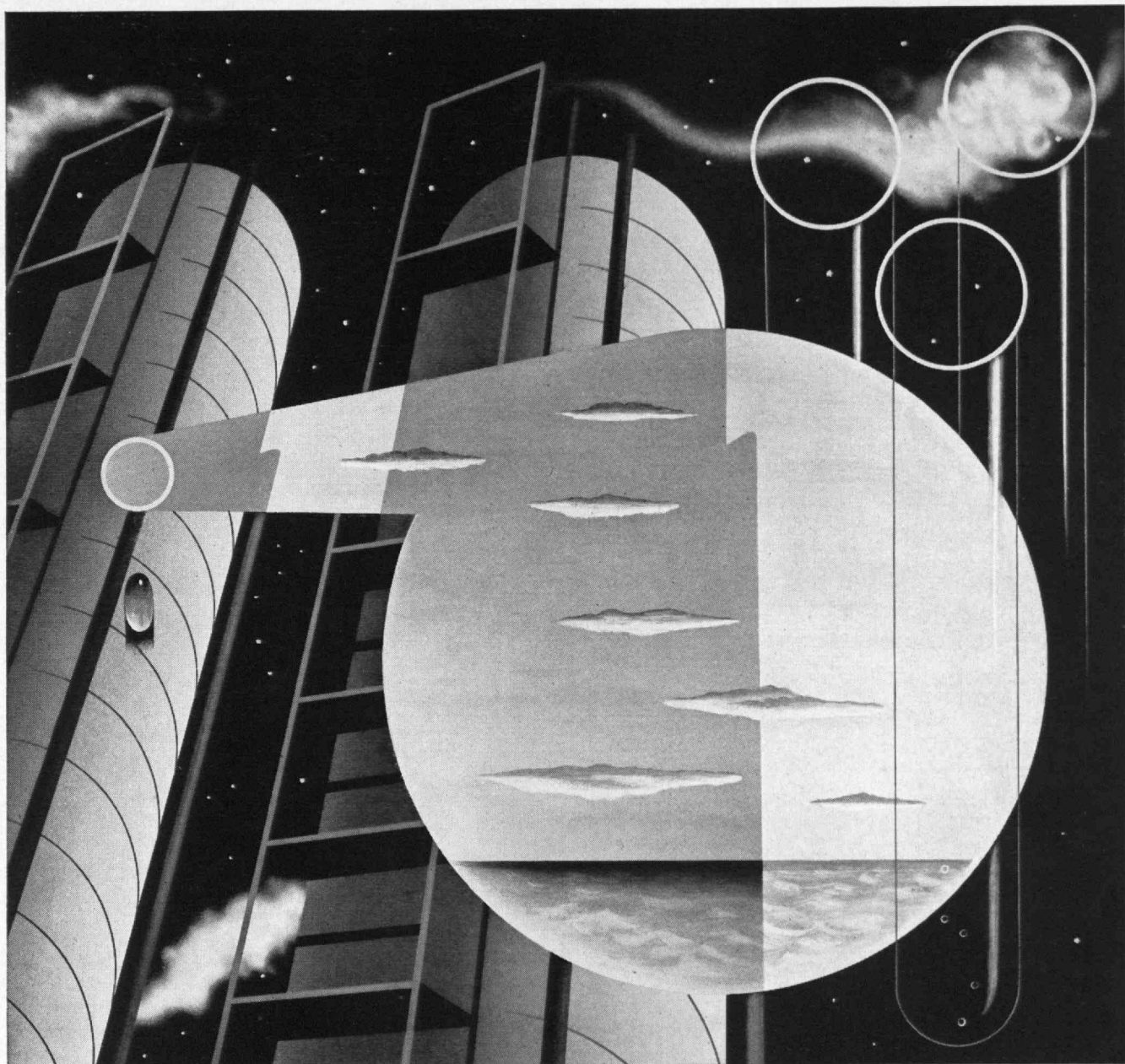
After our industries return to a peacetime basis, a number of changes will probably be made in the production and use of clays. The manufacturer will demand a clay fulfilling more definite specifications than at present — specifications limiting the particle size, particle shape, adsorbed salts, and organic matter. Then instead of compounding a formula of a number of different clays, each one from a district known to the trade only by a certain name, the manufacturer will demand a "tailor-made" clay processed to fulfill his definite specifications. This will permit him to control his manufacturing processes much more closely and thus produce a more nearly uniform article at a lower cost, even though he has to pay somewhat more for the raw materials. In other words, ceramics is changing from an art to a science.

UNCONSCIOUS AMBASSADORS*(Continued from page 186)*

and students traveling to and from the country where he holds his post. Immediately, though, certain difficulties arise, for his position is a junior one in the diplomatic hierarchy and he cannot act with full and independent authority in situations that may need his attention. Nor, because he may have special educational equipment, does that necessarily mean that his judgment in selecting natives of his country of residence to visit the States may be made on the soundest basis. Often without a perfect comprehension of Spanish, with too brief a residence in the country to grasp the kind of invisible pressure that will be put on him, and without enough previous academic administrative experience to make him a good judge of scholars of any land, he must undertake to select youngsters to fit into our completely alien North American curriculums and older men to profit to the fullest by expense-paid trips. With no intent to reflect on any individual valiantly carrying on against accumulated odds, I assert that such an undertaking is impossible of success.

As a result of the present arrangement, we have some astonishingly paradoxical situations which puzzle most those whose good opinions we now most value. Men of questionable sympathies or doubtful political antecedents are naturally the most unscrupulous in using pressure — so that we have had several such enjoying

(Continued on page 196)



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For this is the new, stupendous era of synthetics. Already scientists are talking about glass that will float, wood that won't burn, window screens without wire, machinery bearings without metal.

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for the production of high-octane aviation gasoline.

Miracles are being performed in the petro-chemical industries today. For obvious reasons, they can't be talked about in detail. But they do send this message to every American: Win this war—and the dawn will break on a world more wonderful than you have ever known.

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UNCONSCIOUS AMBASSADORS

(Continued from page 194)

themselves as guests of our State Department while their families gibe at us with a triumphant: "You see, the great United States isn't sure of victory; she wants to have friends in both camps." At the worst, this is only a question of being victimized by those invisible pressures of which I have already written — a taking advantage of our impulsive generosity. But it does not add to the respect with which we are regarded.

Nor does it add to our national stature that our cultural assistant, overworked as he is, finds no time to deal suitably with our miscellaneous emissaries, good, bad, or indifferent, semiofficial or self-appointed, who continue to overflow our long-suffering neighbors. The countries would assume that the professors and scholars, in the selection of whom they themselves in conjunction with our State Department had a hand, might be received with a ceremoniousness to match their own, for our cheerful informality is always a puzzle to them. They might also assume that our assistant would busy himself in curbing the unofficial emissaries.

This latter situation has its highly amusing aspects. Well-meaning Americans, their minds thrilled with recent tourist propaganda, their ears ringing with goodwill programs and discussions of hemisphere solidarity, feel that they, personally, must be up and doing something about it. Until recently, at least, a trickle of these still managed to flow by our State Department, in spite of its stern interdictions against the issuance of passports. So that, instead of many and profitable tourists of brief duration and neutral tones, we now send forth a few energetic folk, enthusiastically announcing their good will, eagerly trying to organize groups for the promotion of this and that in countries where no one ever organizes anything.

I wonder if our Latin neighbors do not find that the most incomprehensible thing about us is our naïve faith in the power of such organizations, whose avowed purpose is to interfere in the private affairs of other folk, individually or collectively. Many of these neighbors, living in a closely knit family group that looks inward toward its own patio, simply cannot interpret the words "good neighbor" in the sense we think they should. Economic and cultural interchange they can understand. But to emerge from their own social group to join societies, to listen to lectures, or just to get together informally to promote anything from good will to sanitation — this is something they are constitutionally reluctant to do.

There is something infinitely refreshing in this great, though unformulated, aversion to organizations. Perhaps it is that we here have gone too far in the other direction. Here, any social or political lack seems to elicit the demand for a society whose avowed purpose is to remedy that lack. Then the society, once formed, easily becomes unwieldy and inflexible and the purpose it was originally to have served is all but lost sight of. So we put a tremendous amount of energy into doing worth-while things by methods that waste a large proportion of that energy. We might learn much from our good neighbors.

(Continued on page 198)



Young by the count of his years, but matured by the weight of the fears he has choked in the vise of his valor, this boy—a little homesick perhaps in his lonely vigil—is the symbol of the millions who will see their first star-shell.

What is he thinking about, out there in the sullen stillness of his post? Whatever it is, you may be sure it has something to do with the life, the people, the plans he left back here. They are a mental magnet to his thoughts—revised occasionally as he ponders what he will come back to.

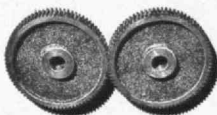
If the pace of production has been maintained, if enough bonds have been bought, if more than words has been devoted to post-war plans, he will come back to feel his contribution has been worthwhile.

It is up to us, here and now, to discharge our obligation to him by producing more, by investing in bonds, by planning for the pent-up, unrationed needs of that day.

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UNCONSCIOUS AMBASSADORS

(Continued from page 196)

I recall particularly one starry-eyed young couple, obviously very fresh from sociological studies, who got themselves terribly excited over the plight of the Guatemalan Indian. I remember coming upon them in a church where mass was being conducted. They were still busily and noisily pursuing their inquiries into the social and agricultural problems of the Indians, who were occupied with the elaborate ceremonies surrounding the day of the titular saint of their village. By the time they had been in the country less than a week, the youngsters decided that something had to be done about the Indians and that they were the ones to start that something, which, naturally, was the formation of a society. So they made the rounds of certain influential citizens who not only were too impeccably polite to suggest the gringos were interfering in matters that were none of their business, but also carried that politeness to the point of attending an organization meeting where bylaws were drawn up and officers duly and gravely elected. Then the youngsters, triumphant with a sense of well-doing, departed whence they had come. And no one, as far as I know, has ever heard of the organization since.

Now I would not try to claim that there is nothing to be done to improve the lot of the Indian. But I doubt if we have the right to direct natives in the making of

such improvements, nor do I think the Indian populations themselves would care for impulsive interference in their ancient and patriarchal groups whose many languages, racial purity, and social organization have had the toughness to persist with astonishingly little modification throughout the 450 years since the conquest. In the mind of this confessed amateur at economics, it seems that to raise their economic status could best be done by the direct method — for example, by working to open a market for their astonishingly beautiful and competently done weavings. With vision and patience and diplomatic skill enough to interest those whose permission must be obtained and to persuade the Indians themselves to co-operate, this might well be done. And the respect for the Indian would rise in his own land as he became an economic asset.

Above and beyond professional organizers, there seem to have been any number of well-meaning Americans who simply couldn't leave this good-will business to others. Impulsive, often eccentric, ladies suddenly decide that here, to quote Winnie-the-Pooh, is "a Good Thing to Do." They offer English lessons, write books about the country on a few weeks' acquaintance, translate native novels, or simply exude good will and cheer after the manner of a couple I saw walking down the main street of Guatemala City wearing collapsible hats ribbed like parasols. There is no question that they left a smile on the face of even the gloomiest passer-by.

(Concluded on page 200)



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UNCONSCIOUS AMBASSADORS

(Concluded from page 198)

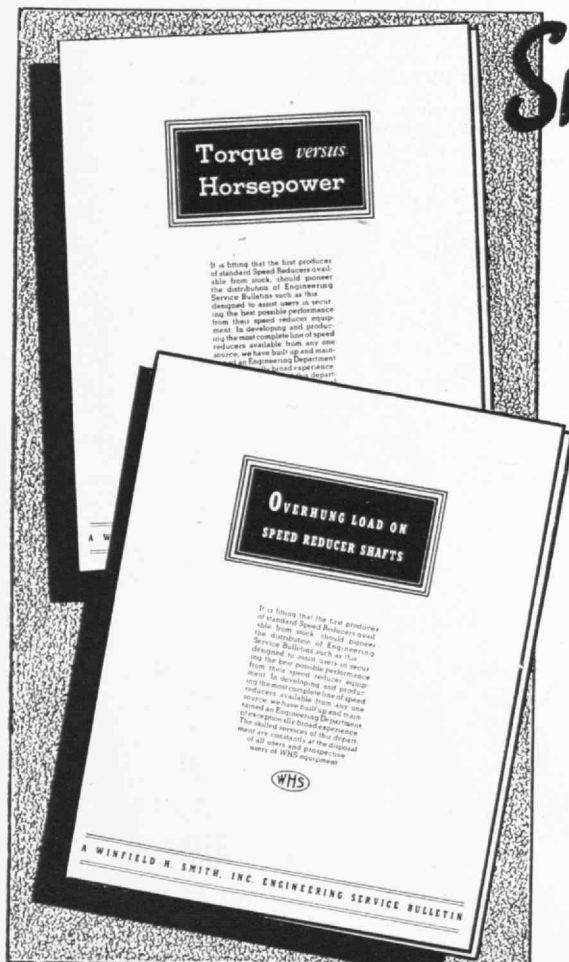
Some, who make the discovery that one cannot live by good will alone, take pay for their lessons — pay which is small enough to us but rather high for the average Latin American student. Here, then, arises the problem of checking up on these teachers, their training, and, most of all, the validity of their claims. One whom I met (not in Guatemala) claimed that she and associated teachers were able to prepare her students to enter American universities as juniors. I believe she was sincere in her claim, but she could not have made good on it without authorization from an American university, which she did not appear to have. The native scholars, who had received her with utmost courtesy, secretly believed that she was deliberately exploiting them and the youngsters who attended her courses.

Matters such as this might best be handled, I presume, by a cultural attaché at legation or embassy. (I still think, however, that some other title would be better.) But the business of purely cultural interchange of students and scholars could, I believe, be better managed outside the State Department. The contribution by our government of a fraction of the money now spent in these matters would suffice to finance all the interchange of such students and scholars that could be

accommodated. The selection of these, however, could best be left to one or more of the privately endowed foundations that have had long experience in gauging scholarly qualities and have the mechanism for such selections already functioning smoothly. It is too much to ask any one man or even a group of men new at such a job to do it well. And if this job is to be done at all, it must be done now, impartially, with high regard for scholarly qualities and for the scholar's own adaptability to strange environment and unfamiliar curriculums.

Since we have undertaken this business of cultural interchange, we must do it well. It is imperative that we do not give the appearance of indifference or make of it all a grandiose gesture that insults the intelligence of our neighbors. If we do, we shall be judged with justice by our southern neighbors and the verdict will be, at the most lenient, that we are stupid; at the saddest, that we are hypocritical.

We must remember here not to count on friendships which armed prowess may seem to win. Nazi propagandists have sowed their seeds of propaganda in the fertile fields we have plowed for them. Unless we take care, those seeds will yet grow and bear fruit even after a long winter of nazi defeat. If I have dwelt on this aspect so little, it is because I believe this problem may be solved on the basis of good taste and good faith alone, never on a basis of imperialistic rivalries.



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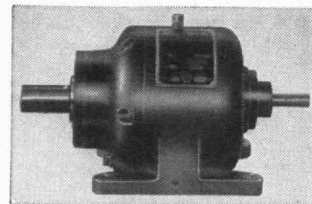
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DESIGN FUTURES

(Continued from page 178)

cabinets readily convertible to new arrangements, lighting units designed around new sources of illumination from fluorescent to "bent light" piped through transparent plastics—these are but a few of the basic changes that will shape tomorrow's interiors. Bathrooms and kitchens will soon reach large-scale production as whole units, to be shipped and installed complete in architectural shells designed to receive them. Built-in fitments and laborsaving appliances, already developed to a high degree, will be constructed not as so many separate units but as batteries of related elements, efficiently and tastefully assembled. Plastics, rubberoids, and new glasses are being employed to take the perspiration out of domestic life, as the airplane has robbed distance of its time. Already pots and frying pans are being made of ceramics; doorknobs, faucets, and window screens, of plastics; stair treads and floor mats, of asphalt; and bathtubs, of plywood.

Packaging, a vital link in the chain of distribution, requires the use of such great amounts of materials, labor, and transportation that restrictions on pre-war buying habits are being extensively enforced. The manufacturers and suppliers of all types of containers must cut down to the barest essentials, with drastic changes resulting in both the body and the treatment of packages. Already some pronounced new trends due to change-over are evident, affecting the entire future of the packaging industry.

Important shortages now occur in such basic materials as tin plate, lead foils, cork, plastics, transparent sheeting, coated surfacing, and certain inks; limitations are also being placed on the use of vital glass, timber, paper, and paperboard. Result: the necessity to re-examine carefully the packaging of all goods and commodities with a view to recommending the elimination of certain materials and methods, the substitution of more plentiful materials, the adjustment to fewer sizes, and the simplification of design, color schemes, and decoration. Up to the present, changes have only begun to appear, but swift revisions are clearly in the making from this point on. Noteworthy changes have been the substitution of fiber canisters for all-metal cans, discontinuation of cellophane and foil wrappings, switch to glass bottles on hundreds of items, standardization of bottle molds, introduction of all-plastic collapsible tubes, re-use of old metal closures and caps, and the broader use of paper containers.

As manufacturer and designer both have been called upon to circumvent new situations, their ingenuity has come to the forefront with some astonishing results that offer bright promise for the future of packaging. Greater visibility has proved so useful a sales stimulant that this trend will be carried to new heights as the cost of transparent plastics comes down. At the outbreak of the war, clear-view plastics were more or less confined to simple rigid geometric shapes such as cylinders or rectangular forms, which could be most easily fabricated. We may look forward to a considerably aug-

(Continued on page 202)

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SCIENCE is defined as systematized knowledge. Air conditioning, to earn the right to be called scientific, must follow an ordered approach to every problem.

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3. Experiment with different arrangements of equipment and air distribution systems calculating performance at different seasons.

4. Develop a theory of solution for this particular problem based on experimentation and calculations.

5. Establish control factors using service records of similar installations to anticipate possible deviations from guaranteed performance in the proposed installation.

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DESIGN FUTURES

(Continued from page 201)

mented variety, however, as molded and extruded plastics invade the domain of odd custom-built containers of infinite diversity. When the metals markets once again become stabilized and tin plate or its equivalent is available, a revolutionary food package awaits the housewife. It will contain a complete meal in its separate compartments, capable of being immersed in hot water and heated in one simple operation. It will solve many problems in marketing, fuel and metal consumption, and dishwashing, in addition to fulfilling its "complete meal-in-a-minute" promise.

The complete shutdown of the automobile assembly lines affords a unique opportunity, on the cessation of the war, to start motorcar design and production on an entirely new basis. Instead of the year-to-year style and motor changes, the industry will be free to tool up from scratch, thus discarding the stranglehold traditions of the past and the cumulative headaches represented by old machine tools and dies. Research and design, as a result, are being directed toward the shape of things as they should be, rather than as they are.

Motorcar engineers are keenly alive to the lessons to be learned from the development of aircraft engines. Fred M. Zeder, chief engineer of the Chrysler Corporation, commenting on the future of the automobile, says:

The present automobile weighs five times as much per horsepower as the aviation engine and develops only half its power per cubic inch of displacement. We can go as far as we want in weight reduction of automobile engines; in fact, it's possible to eliminate 250 from the present average of 600 pounds. Less over-all weight means, in turn, greater economy of fuel. The average mileage will be about 30 per gallon of gasoline.

William B. Stout, aviation and automotive engineer of Detroit, is another exponent of the smaller and more efficient motor. He is convinced that the carbuilders of tomorrow must improve their engines in proportion to the improvement to be made in the engines for private planes. "The future motorcar engine," he says, "need not weigh more than two pounds per horsepower."

In line with advanced thinking on engine design will come radical changes in exterior styling. Again, taking a leaf from aviation's notebook, the automobile stylist will adopt the rounded plastic windshield or "greenhouse" enclosure for the upper structure of the car, thus insuring maximum visibility and safety in driving. This has proved very successful on our new air fighters, giving bombardiers and gunners complete view of all sides, and is favored by all progressive designers of tomorrow's cars. Robert Allan Boyer, research director of the Ford Motor Company, who has achieved some remarkable results in the development of plastics, comments:

Not that a plastic car will be so much better than a steel car, but plastics will enable us to build a better car at lower cost. In our experimental plastic car, our molded rear deck weighed 15 pounds as against 26 for the same section made of steel. Molded plastic weighs only 40 per cent as much as aluminum, and aluminum is only one-third the weight of steel. Hence plastics have a considerable cost advantage.

(Concluded on page 204)

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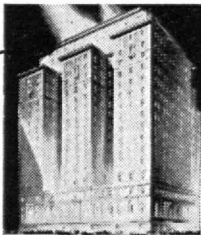
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DESIGN FUTURES

(Concluded from page 202)

The future demands of international co-operation and commerce are generally admitted to call for regular operation of colossal freight and passenger air liners. "Without further experiment the American aircraft industry could begin immediate construction of a type of supertransport airship so large that 200 of them could carry a half million people to Europe monthly," Juan T. Trippe, President of the Pan American Airways System, asserted recently. The supertransport he envisioned would be twice the size of the present ocean clippers. Sailing on regular schedules, such giant liners could provide 24-hour service west from the United States to Chungking or Sydney, and 10-hour service east to London. With refueling, they could continue to Moscow, Cairo, or Bagdad. Charles M. A. Stine, Vice-president of E. I. du Pont de Nemours and Company, Inc., says:

Designers are thinking in terms of hemisphere-spanning freighters and of passenger air-carriers in fleets numbering hundreds of planes. Transcontinental nonstop air trains of gliders, which would drop off or pick up "coaches" over the principal cities en route, are no longer figments of an air manufacturer's dream. They are probabilities.

The big question mark of the future concerns low-priced passenger planes. Will the automobile companies enter the airplane field and vice versa? The airplane manufacturers, with their new superplants geared to war production, will be sorely tempted to bring out lightweight cars as well as planes when the war is over. Newly developed steel alloys of greater strength, more use of plastics, and more nearly perfect engines will be determining factors toward achieving the dream of a plane in every garage. Most automobile men, however, feel that with remarkable improvements and price reductions in each field, the future of both car and plane as separate entities is assured — the car for its maneuverability in city streets, the plane for long-distance travel — each a perfect complement to the other in comfort, travel ease, and service to a nation that will, more than ever, want to "go places and do things."

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THE INSTITUTE GAZETTE

(Concluded from page 189)

is ingenious in the extreme and may offer an application for practical foundry use.

The continued improvement of the Nautical Museum is a matter of gratification to the Committee. It serves a very useful purpose as an adjunct to the courses of the Department. The continued interest and work of Professor James R. Jack in building up the museum are very gratefully acknowledged.

Principles of Naval Architecture, started some five years ago and issued late in 1939, is the outstanding book of its kind in the world. It is now in its fourth edition and has become the textbook in many of the schools of naval architecture, both here and abroad. The Institute's very great contribution was of invaluable assistance in turning out this scientific publication. The first volume of the textbook *Marine Engineering*, prepared under the direction of and at the expense of the Society of Naval Architects and Marine Engineers, is now available to the profession. While Technology's part in this volume is not so large as its contribution to the book on naval architecture, Professor Lewis wrote the chapter on vibration, and the Institute assisted in other ways in the issue of this companion volume.

In conclusion, the Committee report that this excellent Department has conspicuously added to the prestige of M.I.T. because of its high standards. The reports of the graduates of its defense courses are excellent. These students are all college graduates, and the intensive training that they have received has produced men who have met one of the crying needs of the growing demand for trained shipbuilders and marine engineers. Some of the graduates of the Course in Naval Engineering are now actually in command of vessels, and in many ways the results of the thorough training offered in this Department have produced a rich harvest in this time of stress. We believe that the courses are improving in quality and that the Institute is continually bettering its position in the universal recognition that naval architects and marine engineers trained in its halls are well equipped to meet the demands of industry.

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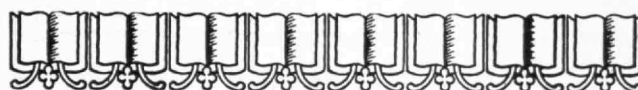
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(Concluded from page 175)

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from Birdum to Port Darwin, made in 1941 to avoid one truck-rail transshipment of goods. The Burma Road, when officially opened in January, 1939, had been built in a mere 14 months and practically without benefit of modern road-making machinery. Much of it was still one way, but a year later the worst sections were widened, certain switchbacks and grades were eased, and some asphalt surfacing was applied, for portions of the route were not only subject to malaria but had to undergo a rainfall of 200 inches between July and September. The Australian highway, unlike the Alcan or Burma, traverses a comparatively flat, arid country; the original program, put through in 1940, had to be completed in four months to escape the rainy season.

Any catalogue of the major strategic roads which have come to pass during the second World War must not overlook those in the Middle East and in Africa north of the equator. For example, the Trans-Iranian Railway, which was opened in 1938, connects the Persian Gulf with the Caspian Sea. Branches of the railway are now being extended east and west from Teheran, capital of Persia. Meanwhile highways have been laid to provide connection between the Trans-Iranian and the Soviet railways in Russian Turkestan and at Tabriz in the Caucasus, respectively. Tabriz, in turn, is connected with Erzurum in Turkey by a new motor road.

Writing in *Foreign Commerce Weekly* for December 5, Edwin W. James, '07, reports that the Fighting French have built "new highways, one about 1,700 and the other about 1,900 miles long, through French Equatorial Africa for the transportation of supplies for the Near East front, under very difficult conditions and at high costs"; and William E. Rudolph, in an article in the January *Geographical Review*, ably summarizes and discusses information now available on progress made also with north and south trans-Saharan routes. Although it seems clear that considerable road building has taken place in these regions within the past few years, exact data are scanty, being still restricted for military reasons. Some which have been released suggest that they have been marketed as propaganda. In due time, however, the African highways built during this war may well come to represent in mileage and utility an engineering achievement fully commensurate with either the Alcan Highway or the Burma Road.

Already we have in North Africa the most striking instance of the significance of a pre-war "strategic road." This is the coastal highway which goes westward along the Mediterranean shore from Cairo across Cyrenaica and Libya — where it has recently been more of a blessing to Montgomery than to Rommel — to Gabès in Tunisia. From Gabès it parallels the railroad as far as Casablanca in Morocco. What is less generally appreciated is that the highway continues beyond Casablanca through Safi and Agadir, where it turns inland through Mauretania and, avoiding Spanish western Sahara, extends to Saint-Louis on the Atlantic Coast at the mouth of the Senegal River. And from Saint-Louis it is only a short railway hop to Dakar.

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THE ALUMNI FUND—ITS PROBLEMS AND GROWTH

IN THE MAILBAG

We get a lot of mail in the Fund office, and some of it's darned interesting — so much so that we think some of you other Alumni might like to take a peek into the mail sack with us. Obviously we wouldn't want to use anyone's name without asking him first, and since some of these men are in Australia and the Solomons, the time element precludes that. So we'll just give you the comments and not the names of the commentators. Maybe you're one of them!

Here's one from "down under," from a captain in an Army bomber squadron. In a letter accompanying his check, he says: "I've been getting your communications with amazing regularity! Have been flying with the Army ever since I left Technology, and have been overseas for about nine months. Australia is a country of extremes — but not bad. Best wishes to the students and staff of the M.I.T."

From Birmingham, England, came a letter from an Alumnus in the Class of 1932. He is a native of Belfast, Ireland, who received his master's degree in the Course in Electrical Engineering. He writes: "I should like you, if you would be so kind, to convey to the Alumni Association the message that we in this country are deeply grateful for all the help the United States of America has given and is giving us, and also for the sympathy and understanding that have helped sustain us throughout severe ordeals and that in adversity bind us to you and you to us in a friendship we believe will never perish." — That's the sort of a letter that really gives us a lift. We know it will you, too — and after all it's addressed to you.

And here's another from which we got a lift, although of another sort. A private in the Marine Corps wrote about the amount of his contribution as follows: "Enclosed you will find a contribution which is about as much as I can afford on a private's pay. It is less than I should like to give, but perhaps I may get promoted within a short time and may be able to do better." — The amount of his contribution was above average!

Sometimes we hear from our Alumni through their families. In many instances we get much

more information this way, particularly if the men are in the service. We received the following from the father of a member of the Class of 1925: "You may be interested to know that my son is a captain in a bomber squadron of the South African Air Force in Egypt. So far he has been lucky and got back safely from each trip, although on one occasion while bombing Italians in Abyssinia he had one of his petrol tanks perforated and must have had a pretty nervous trip back, as the nearest friendly aerodrome was 200 to 300 miles away from the point where he got shot up."

And from the wife of a Course II man in the Class of 1912 comes the following information, which indicates that he has had little time lately to pay much attention to alumni affairs — and that even The Review's capable circulation staff finds it tough going to keep up with him: "My husband was sent by the United States Public Health Service to China on the Yunnan-Burma Railway a year ago last October. He had to flee China in May and escaped to Delhi, India, where he is now with the Army Air Forces."

Some of you men seem to get your mail regularly, even in the thick of things. A naval officer in a Pacific patrol squadron, an Alumnus of 1941, says: "I am enclosing a mail order. I should greatly appreciate it if you would note my new address and see that my correspondence and The Review be so addressed. The mail will all get to me without too much delay, and I can assure you that it will be awaited and received with great eagerness."

The pay-off came in reply to a letter we sent out this fall. Our letter started off: "To a Tech man who is not in the Solomon Islands," and went on to say that anyone who should be there at the time undoubtedly had his hands full. Four weeks later came a check and a letter in an envelope postmarked San Francisco. The letter said: "Don't let that postmark fool you — this *is* from the Solomon Islands — and no kidding!" The postscript of this same letter said: "Our Tokyo Alumni seem to be profiting from a technical education!"

Yes, the mailbag is a very, very interesting institution — thanks to you men. Keep it overflowing!

AN AID TO INDUSTRY IN LOCATING OUTSTANDING MEN

AND YOU?

The war has changed your life — won't you change our records?

What are you doing? What are your responsibilities? We want to know; your Department wants to know; the Institute *needs* to know!

Please write

PLACEMENT BUREAU

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASS.

AN AID TO ALUMNI IN FINDING DESIRABLE POSITIONS

TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND—ITS PROBLEMS AND GROWTH

IN THE MAILBAG

We get a lot of mail in the Fund office, and some of it's darned interesting — so much so that we think some of you other Alumni might like to take a peek into the mail sack with us. Obviously we wouldn't want to use anyone's name without asking him first, and since some of these men are in Australia and the Solomons, the time element precludes that. So we'll just give you the comments and not the names of the commentators. Maybe you're one of them!

Here's one from "down under," from a captain in an Army bomber squadron. In a letter accompanying his check, he says: "I've been getting your communications with amazing regularity! Have been flying with the Army ever since I left Technology, and have been overseas for about nine months. Australia is a country of extremes — but not bad. Best wishes to the students and staff of the M.I.T."

From Birmingham, England, came a letter from an Alumnus in the Class of 1932. He is a native of Belfast, Ireland, who received his master's degree in the Course in Electrical Engineering. He writes: "I should like you, if you would be so kind, to convey to the Alumni Association the message that we in this country are deeply grateful for all the help the United States of America has given and is giving us, and also for the sympathy and understanding that have helped sustain us throughout severe ordeals and that in adversity bind us to you and you to us in a friendship we believe will never perish." — That's the sort of a letter that really gives us a lift. We know it will you, too — and after all it's addressed to you.

And here's another from which we got a lift, although of another sort. A private in the Marine Corps wrote about the amount of his contribution as follows: "Enclosed you will find a contribution which is about as much as I can afford on a private's pay. It is less than I should like to give, but perhaps I may get promoted within a short time and may be able to do better." — The amount of his contribution was above average!

Sometimes we hear from our Alumni through their families. In many instances we get much

more information this way, particularly if the men are in the service. We received the following from the father of a member of the Class of 1925: "You may be interested to know that my son is a captain in a bomber squadron of the South African Air Force in Egypt. So far he has been lucky and got back safely from each trip, although on one occasion while bombing Italians in Abyssinia he had one of his petrol tanks perforated and must have had a pretty nervous trip back, as the nearest friendly aerodrome was 200 to 300 miles away from the point where he got shot up."

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TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Up to January 8 over 3,700 Institute alumni, including 14 Admirals and 37 Generals, were recorded as being in the active military or naval services of the United Nations, and nine had already been officially decorated.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

NEW DECORATIONS

- 1907 Fredendall, Lloyd R., *Maj. Gen.*, Distinguished Service Medal — Oran, North Africa.
 1911 Kenney, George C., *Lt. Gen.*, Purple Heart — New Guinea.
 1913 Jones, Albert M., *Brig. Gen.*, Distinguished Service Cross and Distinguished Service Medal — Philippines.
 1917 Sherman, Forrest P., *Capt. U.S.N.*; Navy Cross — U.S.S. *Wasp*.
 1941 Fletcher, Arthur A., Jr., *Capt.*, U.S.A., Purple Heart.
 1942 Kelley, Charles F., *Lt.*, U.S.A., Silver Star — North Africa.

NEW LISTINGS

U.S.A.

- 1906 Fogg, Charles E., *Lt. Col.*
 1909 Robinson, Clark S., *Lt. Col.*
 1910 Bell, Frank F., *Lt. Col.*
 Lovejoy, Carl H., *Maj.*
 Malone, John F., Jr., *Col.*
 1912 Taylor, Joseph I., *Maj.*
 1913 Merrill, Walter E., *Maj.*
 1914 Mendenhall, Fred D., *Capt.*
 1915 Smithey, Louis P., *Lt. Col.*
 1916 Lapham, Samuel, Jr., *Lt. Col.*
 1918 Braaten, Ingvald, *Capt.*
 Collins, Harold E., *Capt.*
 Parkinson, Donald B., *Maj.*
 1920 Bean, Karl D., *1st Lt.*
 Moffat, Fraser M., Jr., *Lt. Col.*
 Wason, Alfred B., *Maj.*
 1921 Bartlett, Boyd W., *Maj.*
 Crowley, John D., *Capt.*
 Harvey, Arthur R., *Capt.*
 Hill, Robert A., *Maj.*
 Nelles, Philip A., Jr., *Capt.*
 Norling, Wallace C.
 Parsons, James S., *Maj.*
 Skinner, Richmond H., *Capt.*
 Winn, John J., *Maj.*
 1922 Blood, Lawson T., *Capt.*
 Gallagher, E. Francis, *Capt.*
 Laverty, Francis J., *Capt.*
 Plimpton, John A., *Maj.*
 Robb, Russell W., Jr., *Lt. Col.*
 Smith, Charles S., *Capt.*
 1923 Allis, William P., *Maj.*
 Hartwright, Alva J., *Capt.*
 Kerr, Horace J., *Corp.*
 Metcalf, Walter A., *Lt. Col.*
 1924 Billard, Gordon Y., *Lt.*
 Brimberg, Isaac, *1st Lt.*
 Correale, William H., *Capt.*
 Hennessy, John F., *Maj.*
 Ilfeld, Max L., *Capt.*
 MacPherson, Gardner B., *Pvt.*
 Stevenson, Thomas T., *Lt. Col.*
 1925 Butler, Theodore H., *Lt.*
 Coomes, Ralph E., *Capt.*
 DeKay, John W., Jr., *Pvt.*
 Golemon, Albert S., *Capt.*
 Gilbert, Arthur W., *2nd Lt.*
 Glickman, Max, *Pvt.*
 Meaker, O. Phelps
 Smith, Harry B., *1st Lt.*
 West, George G., *Maj.*
 1926 Bates, Joseph D., Jr., *Capt.*
 Diegman, John E., *Maj.*
 Eaton, Thomas J., *Capt.*
 Fireman, Martin M., *1st Lt.*
 Spence, John W., *1st Lt.*
 1927 Berkeley, William P., *Lt.*
 Cuthbertson, Harry B., *Maj.*
 Gerst, George S., *2nd Lt.*
 Hall, Albro, *Capt.*
 Hayward, R. Folsom, *Maj.*
 Hershey, Samuel F., *Capt.*
 Lunden, Eugene B., *Capt.*
 Stone, Edward D., *Capt.*
 1928 Carey, Albert J., *Capt.*

- Fourmier, Norman L., *Capt.*
 Haberstroh, Charles F., *Maj.*
 Larkin, George V., *Capt.*
 O'Hearn, Joseph A., *Capt.*
 Sweeney, Francis C., *Capt.*
 Turner, Burnett C., *Capt.*
 Wade, Stanley F., *Lt.*
 White, Nathaniel, *Capt.*
 1929 Fribance, Austin E., *Maj.*
 Kenerson, Waldo I., *Lt. Col.*
 Turner, Charles A., *T/5*
 1930 Berman, Leslie, *1st Lt.*
 Boynton, Solon D., *Pvt.*
 Edlund, Charles F., *Pvt.*
 Kenyon, John H., *Capt.*
 Roseman, Reuben, *Capt.*
 Verveer, Louis, Jr., *Pvt.*
 1931 Baxter, Robert H., *Capt.*
 Branca, Eugene G., *Capt.*
 Broder, Charles, *Lt.*
 Crotty, Francis C., *Maj.*
 Demars, Arthur J., *Capt.*
 Larkin, Charles E., *Capt.*
 Litrell, Lawrence W., *Capt.*
 McClure, Alfred M., *2nd Lt.*
 Westerfeld, Stuart C., *Maj.*
 1932 Bunker, Carl H., Jr., *Capt.*
 Cummings, Harry W., Jr., *1st Lt.*
 Cunningham, Marcus K., *Sgt.*
 Gustafson, J. Elmer, *1st Lt.*
 Hartigan, Thomas R., *Maj.*
 Hill, Edwin V., *Capt.*
 Ikuno, Frank M., *Lt.*
 Kaeser, William V., *Capt.*
 Negus, Philip E., *Pvt.*
 Wells, William L., *1st Lt.*
 1933 Wright, Robert W., *2nd Lt.*
 Gray, William A., *Capt.*
 Henderson, Elmer C., Jr., *1st Lt.*
 Herlich, Benjamin, *1st Lt.*
 Johnson, Ferdinand M., *Lt.*
 Lebeau, Lawrence C., *Pvt.*
 Peters, Robert E., *2nd Lt.*
 Potter, John D., Jr., *2nd Lt.*
 Shaw, Walter A., *Maj.*
 Smith, Moreland G., *Capt.*
 Spinney, Russell G., *Lt.*
 Sweeney, John D., *Lt.*
 1934 Baskin, Meyer A., *Capt.*
 Fenlon, Richard J., *Pvt.*
 Geltman, Irving R., *1st Lt.*
 Gilman, Turner W., *Capt.*
 Goodnow, Daniel H., *Sgt.*
 Grosjean, Robert L., *Capt.*
 Haseltine, William R., *Capt.*
 Highlands, Matthew E., *Capt.*
 Howse, Godfrey L., *Capt.*
 Johnsen, Norman M., *Capt.*
 Jordon, Robert M., *1st Lt.*
 Parker, Frank C., *Maj.*
 Reynolds, Hereward A., *2nd Lt.*
 Safford, Franklin C., *1st Lt.*
 Woodward, Horace L., Jr., *T/5*
 1935 Bodell, Brandon B., *Lt.*
 Doyle, Francis E., *Maj.*
 Fong, Louis B. C., *1st Lt.*
 Freudenberg, Gustav F., *Lt.*
 Hammond, Roger H., *1st Lt.*
 Hawes, Wilton G., *Sgt.*
 Loomis, Wesley H., III, *Capt.*
 Marquard, Arthur C., Jr., *Lt.*
 Morrisette, George C., *1st Lt.*
 Nolan, David J., Jr., *Pvt.*
 O'Brien, Frederick F., *Capt.*
 Parli, Richard L., *1st Lt.*
 Robinson, Walter G., *Pvt.*
 Slade, Charles E., *Cadet*
 Spinney, Robert W., *Lt.*
 1936 Borden, Herbert M., *1st Lt.*
 Camp, James L., *Capt.*
 Cohn, Clarence, *1st Lt.*
 Ellis, Henry G. E., *Maj.*
 Estabrook, Vincent T., *Lt.*
 Gratz, Joe, *2nd Lt.*
 Morton, Richard F., *Capt.*
 O'Neill, James E., Jr., *1st Lt.*
 Ozol, Rudolph J., *1st Lt.*
 Packard, Vernon L., *Capt.*

- Parker, Franklin P., *Capt.*
 Souder, James J., *Capt.*
 Wuosmaa, Lennart, *Lt.*
 1937 Aksonitas, William E., *Capt.*
 Cormann, Harry, *1st Lt.*
 Cornforth, Robert M., *Capt.*
 Finner, Arthur O., *Maj.*
 Freiberg, James M., *Capt.*
 Matthews, Charles W., *Capt.*
 Nedor, Robert, *Pvt.*
 Osborne, N. Montgomery, Jr., *Maj.*
 Rosenbaum, Arthur H., *Sgt.*
 Stone, Joseph H., *Lt.*
 Viallor, Gregory F., *1st Lt.*
 1938 Bowie, Robert G., *Maj.*
 Cilley, Wesley A., *Cadet*
 Foote, Gordon L., *Capt.*
 Ginsburg, Everett H., *2nd Lt.*
 Kaufman, Walter F., *Lt.*
 Kodama, Sidney F., *Capt.*
 Kornblith, Lester, Jr., *Lt.*
 Miller, Louis M., *1st Lt.*
 Mitchell, Donald G., *1st Lt.*
 Thau, William, *Capt.*
 Torrns, David J., *2nd Lt.*
 Vogel, Paul W., *Lt.*
 Wallach, Samuel, *Pvt.*
 1939 Brenner, Millard M., *2nd Lt.*
 Davies, William E., *1st Lt.*
 Dennis, Albert P., Jr., *Capt.*
 Donatello, Dominic G., *Lt.*
 Doten, Charles W., *Capt.*
 Fober, Henry L., *1st Lt.*
 Heroman, Lee C., Jr., *Lt.*
 Herzberg, Albert, *Cadet*
 Kirshner, Leo, *Sgt.*
 Krebs, George W., *Capt.*
 Laird, Robert S., *2nd Lt.*
 Morgan, Walter H., *Pvt.*
 Schaller, Frederick F., Jr., *1st Lt.*
 Torrns, David J., *2nd Lt.*
 1940 Arch, Arnold, *Lt.*
 Carson, Knight S., *Capt.*
 Casey, John J., *2nd Lt.*
 Goodell, Richard, *Cadet*
 Hagenbuch, William H., *2nd Lt.*
 Harrington, Regis J., *Lt.*
 Markham, Charles H., *1st Lt.*
 Rice, Alfred J., *Lt.*
 Ross, Donald W., *1st Lt.*
 Sabbagh, Edward N., *Cadet*
 Valukonis, Alfons, *1st Lt.*
 1941 Watts, Chester B., Jr., *2nd Lt.*
 Alfred, Robert M., *Lt.*
 Brown, Roy W., Jr., *2nd Lt.*
 Corsa, Leslie, Jr., *2nd Lt.*
 Fairbrother, Raymond M., *1st Lt.*
 Greenbaum, Max, *Capt.*
 Hemans, John G., *1st Lt.*
 Holley, James J.
 Huber, Paul M., *Capt.*
 Kriz, Jack J., *Lt.*
 Langworthy, Richard E., *Lt.*
 Lewis, Philip S., Jr., *1st Lt.*
 McCarthy, John J., *Lt.*
 Miller, Boris, *Lt.*
 Montanaro, Anthony, *1st Lt.*
 Smith, Edgar F., *Lt.*
 Smolensky, Stanley M., *1st Lt.*
 Totten, George C., Jr., *Cadet*
 Turnock, Lawrence C., *2nd Lt.*
 Wallace, John F., *2nd Lt.*
 Wasserman, Harry H., *Lt.*
 1942 Brown, Norman, *Capt.*
 Fork, Donald W., *2nd Lt.*
 Greenes, Bernard A., *Lt.*
 Groves, Quentin D., *Pvt.*
 Hahn, William, *Lt.*
 Hinchman, John, *2nd Lt.*
 Holladay, George C., Jr., *Lt.*
 Insaude, Robert R., *1st Lt.*
 Katz, Maurice N., *2nd Lt.*
 Kelly, Joseph B., *Corp.*
 Levene, Martin B., *1st Lt.*
 Marsilius, Newman G., *1st Lt.*
 Morehouse, Wilbur R., Jr., *Pvt.*
 Mulvaney, John J., *2nd Lt.*
 Reed, Harold M., *Lt.*

Shapiro, Arnold S., *2nd Lt.*
 Yamaschiro, George, *Pvt.*

U.S.N.

- 1901 Cushman, Frank, *Comdr.*
 1908 Ferris, Raymond W.
 1909 Fenger, Frederick A., *Lt. Comdr.*
 Grant, John S., *Lt. Comdr.*
 1912 Baber, Malcolm J., *Lt. Comdr.*
 Hafer, Victor G., *Lt. Comdr.*
 Little, Harold C., *Lt. Comdr.*
 1918 McClintic, Howard H., *Lt. Comdr.*
 1919 Hills, Henry W., *Lt.*
 1920 Frost, Thomas H., *Lt. Comdr.*
 1921 Allen, Henry C., *Lt.*
 1922 Duge, Howard J., *Lt.*
 Muhlenberg, Charles H., Jr., *Lt.*
 Norman, Edward A., *Lt.*
 Perkins, Eaton H., *Lt.*
 Ten Eyck, Harold R., *Lt.*
 1923 Bridgman, Lester B., *Lt.*
 Flather, Herbert H., *Lt. Comdr.*
 Kemper, Simeon V., *Lt. Comdr.*
 Neher, John H., *Lt. Comdr.*
 Plant, Paul R., *Lt.*
 Shaw, Frederick D., *Lt. Comdr.*
 1924 Jones, George W., *Lt. (j.g.)*
 Forsyth, Roland B., *Lt.*
 Kelly, Andrew P., *Lt.*
 McFarland, George C., *Lt.*
 Storey, Francis V., *Lt.*
 1925 Cunniff, James F., *Lt. Comdr.*
 Fletcher, Gilbert B., Jr., *Lt. (j.g.)*
 Ingram, Edward J., *Lt.*
 McCarthy, Edward O., *Seaman 1/c*
 Wilmot, Francis E., *Lt.*
 1926 Dingley, Edward N., *Lt. Comdr.*
 Homsey, Samuel E., *Lt.*
 Hooper, Donald C., *Lt.*
 Harrison, Richard E., *Lt.*
 Richardson, Robert W., *Lt.*
 1927 Innerasky, Richard P., Jr., *Lt.*
 1928 Armstrong, Cole A., *Lt.*
 Hoffman, George M., Jr., *Lt.*
 Kennedy, Donald S., Jr., *Lt.*
 Lord, S. Lindsay, *Lt. Comdr.*
 Wilson, Richard W., *Lt.*
 1929 Bartlett, Willard F., *Lt.*
 Erickson, Earle, *Lt.*
 Hibbard, Donald L., *Lt. Comdr.*
 1930 Giroux, Edward C., *Lt. (j.g.)*
 Glynn, Paul T., *Lt.*
 Nelson, Robert M., *Lt.*
 1931 Colt, William B., *Lt. (j.g.)*
 Coy, Edward F., *Lt. (j.g.)*
 Fritz, Edmund B., *Lt. (j.g.)*
 Nicoll, David, *Lt.*
 Thomas, Norman C., *Lt. (j.g.)*
 1932 Mead, John E., *Lt.*
 Ripley, Ebed L., *Lt. (j.g.)*
 Stover, C. Jack, *Lt. (j.g.)*
 Tate, Robert, *Lt.*
 Welch, Joseph Jr., *Lt. (j.g.)*
 1933 Corrough, Dana D., *Lt. (j.g.)*
 Donahue, Leamon F., *Lt. (j.g.)*
 Ellis, Burton T., *Lt.*
 Hungerford, E. Arthur, *Lt. (j.g.)*
 Leahy, Francis T., *Lt. (j.g.)*
 1934 Awramik, Joseph, Jr., *C.R.M.*
 Coonan, Fred L., *Lt. Comdr.*
 Hempstead, Emerson F., *Lt.*
 1935 Conway, John P., *Lt.*
 Lindenmeyr, Robert E., Jr., *Lt.*
 McKeon, John A., *Lt.*
 Moss, Theodore G., *A.O.M. 3/e*
 1936 Burns, Joseph A., *Ens.*
 Center, Edgar A., *Fireman 1/c*
 Lippitt, Henry F., *2nd, Lt. (j.g.)*
 McKeever, J. Ross, *Lt. (j.g.)*
 Nickerson, Seth C., *Lt.*
 Osborn, Robert M., *Ens.*
 Paskowski, Michael, *Lt. (j.g.)*

- 1937 Graustein, Archibald R., Jr. *Lt. (j.g.)*.
Hershon, Sidney, *Ens.*
Pearce, James W., *Ens.*
Tuttle, David F., Jr., *Lt. (j.g.)*
1938 Clifford, John C., *Phar. Mate 2/c*
Summerfield, John R., *Ens.*
Surprenant, James R., *Ens.*
1939 Arnold, James A., *Lt. (j.g.)*
Bradbury, Kent F., *Ens.*
Green, Jerome B., *Ens.*
Hoffman, Charles H., *Ens.*
Hydemann, William R., *Lt. (j.g.)*
Lavin, Justin P., *Ens.*
Pastene, Robert W., *Ens.*
Smith, Edwin K., Jr., *Ens.*
1940 Carpenter, Albert L., *Ens.*
Dobson, Robert W., *Ens.*
Fodale, Charles B., *Lt. (j.g.)*
Higgins, John A., *Ens.*
Hindale, H. Brook, Jr., *Ens.*
Hutzler, Richard H., *Ens.*
Johnstone, David M., *Ens.*
Lindsey, Mason B., *Ens.*
Valentine, Kendall C., *Ens.*
White, William R., *Ens.*
Wight, M. Arnold, Jr., *Ens.*
Wirkowsky, George, *Ens.*
1941 Anderson, William G., *Lt. (j.g.)*
Bogossian, Ares G., *Lt. (j.g.)*
Fritz, Sigmund, *Lt. (j.g.)*
Gilligan, Charles N., *Mach. 2/c*
Greenbaum, Everett R., *Ens.*
Knapp, Richard P., *Lt.*
Jacobson, David, *Ens.*
Leonhardt, Alexander F., *Lt. (j.g.)*
Riehl, Albert H., *Ens.*
Russell, John F., *Ens.*
Schmidtman, Richard D., *Lt. Comdr.*
Schubert, William L., *Lt. (j.g.)*
Thurlow, David, *Lt. (j.g.)*
1942 Andrew, William G., *Ens.*
Bitter, Joseph N., *Lt.*
Bunn, Robert H., *Ens.*
Conant, Frank R., *Cadet*
Finger, John A., Jr., *Ens.*
Hamilton, Henry L., *Ens.*
Kelly, Douglas V., *Ens.*
Lacy, John W., *Ens.*
Lovelace, Richard S., *Ens.*
Loven, Nils O. J., *Ens.*
Prinz, Harold E., *Ens.*
Reed, Mortimer P., Jr., *Ens.*
Sadler, Monroe S., *Ens.*
Sharpe, Leon M., *Ens.*
Sheetz, John W., *Ens.*
Smith, Tracy, Jr., *Ens.*
Williams, James, Jr., *Ens.*
- U.S.C.G.**
- 1926 Perry, Stewart S., *P.O.*
1932 Lucas, Nicholas K., *Cox.*
1933 Butkas, Ernest, *S.K. 3/c*
1940 Berger, Louis, *Ens.*
- U.S.M.C.**
- 1926 Jacob, John B., *Maj.*
1939 Demange, Robert C., *2nd Lt.*
1942 Scully, Peter R., *Corp.*
- CANADA**
- Army**
- 1913 Young, James V., *Maj. Gen.*
1928 Schwartz, James A. E., *Sqd. Ldr.*
1932 Brillion, Jacques P., *Flight Lt.*
1936 Cameron, Clyde F., *Maj.*
1939 Nowlan, Frederick, Jr., *Sqd. Ldr.*
1940 Buller, Arthur E., *Flight Lt.*
Hogg, Nelson, *Lt.*
Nightingale, William E., *Cadet*
- Navy**
- 1939 Hyman, Ernest R., *Lt.*
- CHANGES IN RANK**
- U.S.A.**
- 1905 Beard, Robert S., *Lt. Col. to Col.*
Damon, John C., *Lt. Col. to Col.*
1909 Blood, Kenneth T., *Brig. Gen. to Maj. Gen.*
Scharff, Maurice R., *Maj. to Lt. Col.*
1910 Jacobs, Richard C., Jr., *Lt. Col. to Col.*
1911 Spalding, Sidney P., *Brig. Gen. to Maj. Gen.*
Yearance, Alexander W., *Capt. to Maj.*
1912 Clark, Howard F., *Lt. Col. to Col.*
1916 Hastie, Frank B., *Maj. to Lt. Col.*
Lieber, Albert C., Jr., *Lt. Col. to Col.*
1917 Collins, Hubert W., *Lt. Col. to Col.*
Medding, Walter L., *Lt. Col. to Col.*
Rogers, Jesse A., Jr., *Lt. Col. to Col.*
1919 Derby, Henry S., *Maj. to Lt. Col.*
1920 Higgins, Austin D., *Maj. to Lt. Col.*
Taber, Thomas R., *Maj. to Col.*
Whitten, Lyman P., *Col. to Brig. Gen.*
1921 Bixby, Harold O., *Maj. to Col.*
Cohen, Asher Z., *Maj. to Lt. Col.*
Counts, Gerald A., *Capt. to Col.*
Davis, Merle H., *Maj. to Col.*
Hardin, John R., *Capt. to Col.*
Hewitt, Leland H., *Capt. to Col.*
Jackson, Dugald C., Jr., *Maj. to Lt. Col.*
1922 Hogan, Randall J., *Lt. Col. to Col.*
Howard, Clinton W., *Col. to Brig. Gen.*
1923 Beretta, John W., *Maj. to Lt. Col.*
Chavin, Raphael S., *Lt. Col. to Brig. Gen.*
Christmas, John K., *Maj. to Brig. Gen.*
Deitrick, Carroll H., *Lt. Col. to Col.*
Huling, John, Jr., *Lt. Col. to Col.*
Johnson, Alfred B., *Lt. Col. to Col.*
Jones, Harris, *Lt. Col. to Col.*
McReynolds, George B., *Maj. to Col.*
Olmsted, Burnett R., *Maj. to Col.*
Potter, Wilson, Jr., *Capt. to Maj.*
Pratt, Percy P., *Maj. to Lt. Col.*
Young, Cecil G., *Lt. Col. to Col.*
1924 Quarles, William W., *Capt. to Maj.*
Shulits, Samuel, *1st Lt. to Capt.*
Stern, I. Henry, *Maj. to Lt. Col.*
Stewart, Harold P., *Maj. to Col.*
1925 Duell, Clifford C., *Capt. to Lt. Col.*
Merewether, Arthur F., *Lt. Col. to Col.*
Oettinger, George, Jr., *Capt. to Maj.*
Ruble, Edmund O., *Capt. to Maj.*
1926 Ashbridge, Whitney, *Maj. to Lt. Col.*
Daniels, Robert W., *Lt. Col. to Col.*
McCornack, Willard F., *Capt. to Maj.*
Rogers, Robert W., *1st Lt. to Capt.*
1927 Dillon, Leo J., *Maj. to Col.*
Horton, Donald F., *Capt. to Lt. Col.*
Jacobs, Reginald F., *Capt. to Maj.*
Smith, Charles C., *Capt. to Maj.*
Smith, Kenneth E., *1st Lt. to Maj.*
Thomas, Gordon E., *Capt. to Maj.*
1928 Brown, Vernon S., *1st Lt. to Capt.*
Freeman, James W., *Maj. to Col.*
Hough, Benjamin K., Jr., *Capt. to Maj.*
Knight, Alfred C., *Capt. to Maj.*
1929 David, Marshall S., *Capt. to Maj.*
Gentzkow, Cleon J., *Lt. Col. to Col.*
Gold, Kenneth M., *1st Lt. to Maj.*
Marriott, Carl L., *Lt. Col. to Col.*
Porzheimer, Arthur C., *Pvt. to 2nd Lt.*
Shorter, Wade H., Jr., *1st Lt. to Capt.*
Tammara, Alfonso, *Capt. to Maj.*
1930 Biggane, James F., *1st Lt. to Capt.*
Conway, Harold J., *Maj. to Col.*
Cox, Gilbert L., *Maj. to Lt. Col.*
Dunn, Cecil G., *Maj. to Lt. Col.*
Falk, Myron S., Jr., *Capt. to Maj.*
Heifetz, Arthur, *1st Lt. to Capt.*
Myers, Horace W., *1st Lt. to Capt.*
Rice, James W., *Maj. to Col.*
Small, Charles H., *1st Lt. to Maj.*
Smith, Fairleigh E., *Capt. to Maj.*
Whitehead, Richard S., *1st Lt. to Capt.*
Williams, Randolph P., *Maj. to Col.*
1931 Abramson, Samuel S., *1st Lt. to Capt.*
Allen, William I., *Capt. to Col.*
Boynnton, Wyman P., *1st Lt. to Capt.*
Finberg, Irving W., *Capt. to Maj.*
Kamy, Harry D., *Capt. to Maj.*
Loucks, Charles E., *Col. to Brig. Gen.*
McNamara, Tim L., *Capt. to Maj.*
Niles, Wallace E., *Maj. to Col.*
Preece, Robert M., *1st Lt. to Capt.*
Ritchie, Frederick A., *Capt. to Maj.*
Roddy, Gilbert M., *Capt. to Maj.*
Slavin, John, *Capt. to Maj.*
Vincent, Thomas K., *Maj. to Col.*
1932 Adams, Henry K., *Corp. to Techn. Gr. 4.*
Bassett, Ralph H., *Maj. to Col.*
Falk, George W., *1st Lt. to Capt.*
Isselhardt, Charles W., *1st Lt. to Capt.*
MacKusick, Arthur L., *Capt. to Maj.*
Morgan, Richard L., *Capt. to Maj.*
Moy, Arthur, *Pvt. to 2nd Lt.*
Murphy, George J., *1st Lt. to Capt.*
Senior, Edward, *S. Sgt. to 1st Lt.*
Williams, Myron L., *1st Lt. to Capt.*
1933 Beldon, Morris C., *1st Lt. to Capt.*
Frisby, Vincent C., *Maj. to Lt. Col.*
Galvin, Thomas F., *1st Lt. to Capt.*
Julian, Leonard J., *Capt. to Maj.*
Kabrich, William C., *Col. to Brig. Gen.*
Keller, Charles, Jr., *1st Lt. to Lt. Col.*
MacDonald, Hugh W., *Capt. to Maj.*
MacMillan, Charles W., *Capt. to Maj.*
Regan, John W., Jr., *Capt. to Maj.*
Roetting, Frederick C., *1st Lt. to Capt.*
Smilg, Benjamin, *1st Lt. to Capt.*
1934 Bull, George G. M., *Capt. to Maj.*
Cook, Carlton J., *Capt. to Maj.*
Coleman, William E., *1st Lt. to Capt.*
Ehrmann, Winston W., *Capt. to Maj.*
Heald, John M. D., *1st Lt. to Capt.*
Jenkins, Francis G., *1st Lt. to Capt.*
Jewett, Raymond B., *1st Lt. to Capt.*
Jones, Wilbur M., *2nd Lt. to 1st Lt.*
Kraybill, William S., *Pvt. to 1st Lt.*
Leighton, Harold C., *1st Lt. to Capt.*
Lidoff, Herbert J., *1st Lt. to Capt.*
Locke, Edward B., *Capt. to Maj.*
Loring, Albert D., *1st Lt. to Capt.*
Read, Walter F., *Capt. to Maj.*
Reiss, Winold T., *1st Lt. to Capt.*
Rosenfeld, Abraham, *1st Lt. to Capt.*
Silberman, Marvin J., *1st Lt. to Capt.*
Vaughan, Frederick W., *1st Lt. to Capt.*
1935 Bemis, Hal L., *Capt. to Maj.*
Besson, Frank S., Jr., *1st Lt. to Lt. Col.*
Blair, Thomas W., *1st Lt. to Maj.*
Blocker, Benjamin, *1st Lt. to Capt.*
Clark, Lloyd E., Jr., *1st Lt. to Capt.*
Daley, Paul W., *1st Lt. to Capt.*
Fraser, William B., *Capt. to Lt. Col.*
Gilmont, Paul, *1st Lt. to Capt.*
Kelakos, Michael G., *1st Lt. to Capt.*
Lincoln, Rush B., Jr., *1st Lt. to Lt. Col.*
Nelson, Bernard H., *1st Lt. to Capt.*
Oldham, Joseph S., *Corp. to 2nd Lt.*
Poisson, William H., *Pvt. to 1st Lt.*
Smith, Phillips, *Maj. to Lt. Col.*
Tebbetts, John C., *1st Lt. to Capt.*
Tolman, Lee P., *1st Lt. to Capt.*
Winiarski, Kasmierz J., *1st Lt. to Capt.*
1936 Brewer, H. Whitin, *Pvt. to 2nd Lt.*
Bryant, Richard U., *1st Lt. to Capt.*
Carten, Frederick H., *1st Lt. to Capt.*
Carter, Marshall S., *Maj. to Lt. Col.*
Gates, Clayton S., *Capt. to Maj.*
Herb, Edward G., *Capt. to Lt. Col.*
Holman, Charles R., *1st Lt. to Capt.*
Johnson, Henry C., *1st Lt. to Maj.*
Myers, John A., *1st Lt. to Capt.*
1937 Arnold, William O., *Capt. to Maj.*
Black, Ross E., *Sgt. to 2nd Lt.*
Chase, Charles C., *1st Lt. to Capt.*
Gander, John H., *1st Lt. to Capt.*
Hazeltine, Allen V., *Capt. to Maj.*
Herbig, Edwin T., Jr., *1st Lt. to Capt.*
Lewis, Hubert duB., *Capt. to Lt. Col.*
Mather, John P., *1st Lt. to Capt.*
Miller, James F., *1st Lt. to Capt.*
Neagle, Francis E., Jr., *1st Lt. to Capt.*
Ortynsky, Roman L., *1st Lt. to Capt.*
Siegelman, George A., *1st Lt. to Capt.*
Thorson, Robert H., *1st Lt. to Capt.*
Walsh, James E., *1st Lt. to Maj.*
White, Abner, *1st Lt. to Capt.*
Wojtczak, Walter S., *1st Lt. to Capt.*
1938 Auwerter, Jay P., *1st Lt. to Capt.*
Bethel, John S., *1st Lt. to Capt.*
Boland, Frederick E., *1st Lt. to Capt.*
Brown, Staunton L., *Capt. to Maj.*
Buehler, John P., *Maj. to Lt. Col.*
Clark, Lloyd K., *Capt. to Maj.*
Heintz, A. Preston, *1st Lt. to Capt.*
Levine, Abraham B., *Pvt. to Cadet*
Lohman, Ira H., *1st Lt. to Capt.*
Niles, Ellery W., *1st Lt. to Lt. Col.*
1939 Guy, C. William, *1st Lt. to Capt.*
Hansen, Floyd A., *Maj. to Lt. Col.*
Honnell, Pierre M., *Capt. to Maj.*
Jeffus, Charles J., *Capt. to Maj.*
Kerker, John H., *Lt. to Lt. Col.*
Meals, Robert W., *Capt. to Lt. Col.*
Olson, Arthur R., *2nd Lt. to 1st Lt.*
Seykota, Harold R., *1st Lt. to Capt.*
Stewart, Oswald, II, *1st Lt. to Capt.*
Stuart, Alexander J., Jr., *Capt. to Maj.*

- Tucker, Ralph W., *1st Lt. to Capt.*
 Willard, William R., *1st Lt. to Capt.*
 Zallen, Joseph, *Pvt. to 2nd Lt.*
 1940 Barker, Wensley, Jr., *1st Lt. to Capt.*
 Bowman, Thomas P., *Cadet to 2nd Lt.*
 Cole, Donald M., Jr., *1st Lt. to Capt.*
 Goldberg, Louis G., *1st Lt. to Capt.*
 Graham, Jackson, *Capt. to Lt. Col.*
 Hollomon, J. Herbert, *2nd Lt. to 1st Lt.*
 Pomeroy, William W., *Cadet to 2nd Lt.*
 Sedgwick, Harry K., *2nd Lt. to 1st Lt.*
 Shufin, Leo, *Pvt. to 2nd Lt.*
 Vanderpool, John A., *1st Lt. to Capt.*
 Wilmarth, Clarence M., *2nd Lt. to 1st Lt.*
 1941 Avery, Henry, *2nd Lt. to 1st Lt.*
 Blake, Robert W., Jr., *1st Lt. to Capt.*
 Bohr, Kenneth A., *1st Lt. to Capt.*
 Cartwright, Everett J., *1st Lt. to Capt.*
 Conti, Mario W., *2nd Lt. to 1st Lt.*
 Davis, Leighton I., *1st Lt. to Lt. Col.*
 Diddlebock, William H., *Capt. to Maj.*
 Finch, Rogers B., *1st Lt. to Capt.*
 Hayes, Edgar E., *1st Lt. to Capt.*
 Hill, Alan, *1st Lt. to Capt.*
 Kern, Walter P., *Pvt. to 2nd Lt.*
 Melchor, Alejandro, *Maj. to Lt. Col.*
 Palmiter, Russell B., *2nd Lt. to 1st Lt.*
 Radcliffe, Harold, *1st Lt. to Capt.*
 Reeves, Milton C., *2nd Lt. to 1st Lt.*
 Seaver, James T., Jr., *1st Lt. to Capt.*
 Shapira, Norman I., *1st Lt. to Capt.*
- Staff, Edgar J., *Capt. to Maj.*
 Werby, Russell T., *1st Lt. to Capt.*
 1942 Brown, Monroe R., *1st Lt. to Capt.*
 Connell, Milton M., Jr., *Cadet to 2nd Lt.*
 Gartland, Edward V., Jr., *2nd Lt. to 1st Lt.*
 Hense, William E., Jr., *Cadet to 2nd Lt.*
 Herlihy, Francis B., *2nd Lt. to 1st Lt.*
 Klercker, Fred B., *Pvt. to 2nd Lt.*
 Miller, William H., *2nd Lt. to 1st Lt.*
 Paletz, Harry J., Jr., *Pvt. to 2nd Lt.*
 Pentz, Arthur H., *Cadet to 1st Lt.*
 Sickels, George H., Jr., *1st Lt. to Capt.*
 Speas, Charles A., *2nd Lt. to 1st Lt.*
- U.S.N.**
 1905 Willson, Russell, *Rear Adm. to Vice Adm.*
 1913 Smith, Edward H., *Comdr. to Rear Adm.*
 1915 Smith, William H., *Comdr. to Capt.*
 1916 Larner, Harold, *Lt. Comdr. to Comdr.*
 1917 Gokey, Noah W., *Comdr. to Capt.*
 Paine, George T., *Comdr. to Capt.*
 1919 Hewes, Frederick R., *Comdr. to Capt.*
 1920 Cochran, Edward L., *Capt. to Rear Adm.*
 Pennoyer, Frederick W., Jr., *Comdr. to Capt.*
 1923 Haugen, Lawrence T., *Comdr. to Capt.*
 Nibecker, Paul B., *Lt. Comdr. to Capt.*
 1924 France, Albert F., *Comdr. to Capt.*
 McShane, Ralph E., *Lt. Comdr. to Capt.*
 Pihl, Paul E., *Lt. Comdr. to Capt.*
 1925 Draim, Nicholas A., *Lt. Comdr. to Capt.*
- Lonnquest, Theodore C., *Comdr. to Capt.*
 1926 Franklin, William R., *Lt. to Lt. Comdr.*
 Helber, Carlyle L., *Lt. Comdr. to Capt.*
 Huske, Joseph C., *Lt. Comdr. to Comdr.*
 Quarton, Dale, *Lt. to Comdr.*
 1927 Hofman, Erik, *Lt. to Lt. Comdr.*
 Parker, Paul E., *Lt. to Lt. Comdr.*
 Shillingford, John T., *Lt. to Lt. Comdr.*
 1930 Landers, Wilbur N., *Lt. Comdr. to Comdr.*
 1933 Chipp, Rodney D., *Lt. (j.g.) to Lt.*
 Tooke, Charles M., *Lt. to Lt. Comdr.*
 1934 Vangeli, Mario G., *Lt. to Lt. Comdr.*
 1936 Pettebone, Edgar R., *Ens. to Lt. (j.g.)*
 Trescott, Charles E., *Lt. to Lt. Comdr.*
 1937 Menzl, Leon A., *Ens. to Lt. (j.g.)*
 Miller, William R., *Lt. to Lt. Comdr.*
 Winsor, K. Weston, *Ens. to Lt.*
 1938 Des Jardins, Paul R., *Ens. to Lt. (j.g.)*
 West, Richard K., *Ens. to Lt. (j.g.)*
 1939 Herr, Donald L., *Ens. to Lt. (j.g.)*
 Knoll, Denys W., *Lt. to Lt. Comdr.*
 Loesch, Richards L., Jr., *Ens. to Lt. (j.g.)*
 Rex, Daniel F., *Ens. to Lt. (j.g.)*
 1940 Barton, Alfred P., *Ens. to Lt. (j.g.)*
 Bloom, L. Hurley, *Ens. to Lt. (j.g.)*
 Grosselfinger, Robert A., *Ens. to Lt. (j.g.)*
 Herr, Richard E., *Ens. to Lt. (j.g.)*
 1941 Betts, Sherman W., *Lt. to Lt. Comdr.*
 Franklin, James G., *Lt. to Lt. Comdr.*
 Franz, Robert A., *Ens. to Lt. (j.g.)*
 Mengel, Arnold S., *Cadet to Ens.*
- Shyne, William V., Jr., *Ens. to Lt. (j.g.)*
 Wade, Howard W., *Ens. to Lt. (j.g.)*
- U.S.C.G.**
 1917 Perkins, Louis W., *Comdr. to Capt.*
 1923 Loewus, Julian S., *Lt. to Lt. Comdr.*
 1929 Creedon, William E., *Lt. to Lt. Comdr.*
 Harding, Lawrence M., *Lt. Comdr. to Comdr.*
 1931 Feola, Ralph S., *Lt. to Lt. Comdr.*
- U.S.M.C.**
 1925 Miller, Ivan W., *Lt. Col. to Col.*
 1933 Brownell, Walter T., *Capt. to Maj.*
- RANK NOT PREVIOUSLY PUBLISHED**
 1924 Shore, Henry, *Maj., U.S.A.*
 1935 Dale, David W., *Pvt., U.S.A.*
 1938 Cohen, Edward L., *W.O., U.S.A.*
 McEvoy, Leo C., Jr., *Lt., U.S.A.*
 1942 Deleo, Felix R., *Lt., U.S.A.*
 Nelson, Peter K., *1st Lt., U.S.A.*
 Wilcox, Roger, *2nd Lt., U.S.A.*
- CASUALTIES**
 1921 *Lyon, Alfred J., *Maj., U.S.A.*
 1933 †Mitchell, Floyd A., *Lt. Col., U.S.A.; Philippines.*
 1934 *Emery, Robert M., *Lt., U.S.A.; North Africa.*
 1937 †Bartlett, David B., *Lt., U.S.A. (Previously reported Missing in Action); Corregidor.*
 1939 *Jackson, John W., *Lt., U.S.A.*
 †Rosen, Melvin H., *Capt., U.S.A.; Corregidor.*
 1942 *Augusterfer, Donald W., *Ens., U.S.N.; Guadalcanal.*
 *Pfueger, James W., *2nd Lt., U.S.A.; North Africa.*
- * Killed in Action * Died in Service † Reported Missing in Action ‡ Reported Captured

ALUMNI IN THE HIGH COMMAND

- U.S.A.**
 1907 Fredendall, Lloyd R., *Maj. Gen.*
 Godfrey, Stuart C., *Brig. Gen.*
 1909 Blood, Kenneth T., *Maj. Gen.*
 1911 Kenney, George C., *Lt. Gen.*
 Spalding, Sidney P., *Maj. Gen.*
 Weeks, Lawrence B., *Brig. Gen.*
 1913 Gardner, Fulton Q. C., *Maj. Gen.*
 †Jones, Albert M., *Brig. Gen.*
 1914 Waitt, Alden H., *Brig. Gen.*
 1916 Boatwright, Walter P., *Brig. Gen.*
 Harms, Henry W., *Brig. Gen.*
 Hyde, James F. C., *Brig. Gen.*
 1917 Kingman, Allen F., *Brig. Gen.*
- Williford, Forrest E., *Brig. Gen.*
 1920 Van Volkenburgh, Robert H., *Brig. Gen.*
 Whitten, Lyman P., *Brig. Gen.*
 1921 Allen, Harvey C., *Brig. Gen.*
 Donovan, Richard, *Maj. Gen.*
 Moses, Raymond G., *Brig. Gen.*
 Murray, Maxwell, *Maj. Gen.*
 Quinton, Alfred B., *Brig. Gen.*
 Scott, Stanley L., *Brig. Gen.*
 1922 Hoge, William M., *Brig. Gen.*
 Howard, Clinton W., *Brig. Gen.*
 Johns, Dwight F., *Brig. Gen.*
 Styer, Wilhelm D., *Brig. Gen.*
 1923 Chavin, Raphael S., *Brig. Gen.*
 Christmas, John K., *Brig. Gen.*
- ‡andall, Russell E., *Brig. Gen.*
 1924 Doolittle, James H., *Maj. Gen.*
 Henry, Stephen G., *Brig. Gen.*
 McSherry, Frank J., *Brig. Gen.*
 Wells, Gordon M., *Brig. Gen.*
 1926 Danielson, Wilmot A., *Brig. Gen.*
 Loucks, Charles E., *Brig. Gen.*
 1931 Kabrich, William C., *Brig. Gen.*
- Canadian Army**
 1913 Young, James V., *Maj. Gen.*
- U.S.C.G.**
 1896 Hamlet, Harry G., *Rear Adm.*
- U.S.N.**
 1901 Whitman, Ralph, *Rear Adm.*
 1905 Furer, Julius A., *Rear Adm.*
 Willson, Russell, *Vice Adm.*
 1907 Land, Emory S., *Rear Adm.*
 Ryden, Roy W., *Rear Adm.*
 Van Keuren, Alexander H., *Rear Adm.*
 1909 Howard, Herbert S., *Rear Adm.*
 1913 Smith, Edward H., *Rear Adm.*
 1914 Richey, Thomas B., *Rear Adm.*
 1915 Brand, Charles L., *Rear Adm.*
 1917 Pace, Ernest M., Jr., *Rear Adm.*
 1920 Cochran, Edward L., *Rear Adm.*
 1921 Vickery, Howard L., *Rear Adm.*

ALUMNI AND OFFICERS IN THE NEWS

The Press Salutes

❑ RUSSELL WILLSON '05, vice-admiral, in the Washington, D.C., *Post* of November 16. Admiral Willson is deputy commander in chief of the United States fleet. The article, which describes his family, education, and naval and diplomatic career, concludes as follows: "Those who have worked with him describe Admiral Willson as having 'an incredibly brilliant mind and a lightning conception of the problems at hand. . . .'"

❑ GEORGE C. KENNEY '11, lieutenant general, in the Omaha, Neb., *World-Herald* of November 29. General Kenney is honored for his forceful and aggressive action as commander of Allied air forces in the southwest Pacific.

❑ LELAND H. HEWITT '21, colonel, in the Durham, N.C., *Morning Herald* of December 16. Colonel Hewitt has been made chief of a combat engineer regiment at Camp Butner.

❑ ROBERT R. NEYLAND, JR., '21, colonel, in the Dallas, Texas, *News* of December 3. Colonel Neyland is described as "having established an enviable record both as an Army officer and a football coach." He was once head coach of the famous University of Tennessee Vols.

Congratulations

❑ To CHARLES-EDWARD A. WINSLOW '98, who was awarded the Sedgwick Memorial Medal by the American Public Health Association in recognition of his distinguished service in public health. The award was made at the 71st annual meeting of the association in St. Louis in October.

❑ To HAROLD S. OSBORNE '08, who was re-elected chairman of the standards council of the American Standards Association at the annual meeting in New York in December.

❑ To RUFUS E. ZIMMERMAN '11, who was re-elected president of the American Standards Association for the third term.

❑ To PER K. FROLICH '23, who was elected president of the American Chemical Society. According to the *Chemical and Engineering News* for December, Dr. Frolich is the youngest man to serve as president of the society in more than 30 years. The following tribute is from the *Newark Star-Ledger* of November 20: "A native of Norway, Dr. Per K. Frolich

has the distinction of having made great contributions in the development of industrial science in America. . . ."

❑ To JOHN J. MURPHY '23, who was elected vice-president of the new products division of the Linde Air Products Company, New York City.

Written

❑ BY THOMAS C. DESMOND '09, "Municipal Meat Inspection," *American City*, December.

❑ BY DAVID O. WOODBURY '21, "Broken Ships Made New," *Scientific American*, December.

❑ BY MARTIN A. GILMAN '36, "Voltage Regulation of Variacs," *General Radio Experimenter*, December.

Tribute in the Fourth Estate

❑ To EDMUND T. ALLEN '23, in a column in the New York *Sun* of December 12. Mr. Allen, who tests the world's biggest bombers, delivered the Wright Brothers Lecture before the Institute of the Aeronautical Sciences in New York on December 17.

❑ To CHARLES A. THOMAS '24, in the Mobile, Ala., *Press Register* of December 13. In the interview Dr. Thomas is described as "one of the nation's most noted chemical engineers."

❑ To OSCAR S. COX '27, assistant solicitor general, in a column in the Washington, D.C., *News* of December 12, for being "one of Government's most successful lawyers."

❑ To PAUL H. ROBBINS '36, in the New York *Civil Service Leader* of November 24, for his varied talents and for his work in connection with wartime training courses.

DEATHS

* Mentioned in class notes.

❑ JOHN C. LEE '87, December 16.*

❑ JOHN BLODGETT '88, September 26.*

❑ BENJAMIN G. BUTTOLPH '88, October 16.*

❑ GARY N. CALKINS '90, January 4.

❑ JAMES A. CARNEY '90, July 16.*

❑ EDWARD A. NORTHEY '90, November 17.*

❑ HUBERT G. RIPLEY '90, December 15.*

❑ DAVID A. AMBROSE '91, December 5.*

❑ FREDERICK C. BLANCHARD '91, December 9.*

❑ WILLIAM R. KALES '92, December 3.*

❑ WILLIAM H. MESSENGER '92, November.*

❑ ROBERT R. TAYLOR '92, December 20.

❑ CLYDE N. FRIZ '94, November 22.*

❑ JAMES McCABE '94, May 7.*

❑ AZEL AMES '95, November 23.*

❑ CHARLES E. BIRGE '95, November 22.*

❑ ROGER J. WILLIAMS '95, December 14.*

❑ WALTER S. WILLIAMS '95, December 18.*

❑ ARTHUR T. HOPKINS '97, December 19.

❑ HARRINGTON BARKER '98, December 23.

❑ FRANCIS P. BERGEN '98, November 22.

❑ ISABEL BEVIER '98, March 18.*

❑ ALBERT W. HITCHCOCK '98, July 25.

❑ EDWIN R. KING '98, October 24.

❑ EDWIN E. WIGHTMAN '98, January 28.

❑ FRED A. POOLE '02, November 5.*

❑ PAUL WEEKS '02, December 20.

❑ JAMES M. GAMMONS '03, November 2.

❑ WILLIAM G. LOGUE '08, December 16.

❑ MILTON S. CLARK '09, October 4, 1939.*

❑ ROBERT C. KERR '09, March 6, 1941.*

❑ JOHN T. HEFFERNAN, JR., '22, December 12.

❑ ISADORE OLEF '22, December 16.*

❑ FRANCIS J. GRUETER '26, December 7.

❑ KENNETH C. HAWTHORNE '26, November 15.*

❑ GEORGE L. COLBURN, JR., '33, September 26.

❑ ROBERT M. EMERY '34, November 8.*

❑ ERSKINE R. KELLY '34, February 15, 1942.*

❑ MILLARD F. MANNING '34, June.*

❑ GILBERT W. WINSLOW '37, November 28.*

❑ HERBERT W. HAINES '39, November 28.

❑ ARTHUR DZENOLET '42, November 28.* (See also '37 notes.)

❑ CUTLER JONES '42, November 26.*

❑ STEPHANE OPPENHEIM-ERRERA '42, December 3.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Hartford

The Club held its first dinner meeting of the season on December 17 at the Hotel Garde in Hartford. The program, entertainment, attendance, and publicity committees worked hard to make the affair a success, and they were rewarded for their efforts by a turnout of 40 members, in spite of zero weather and slippery roads.

The business meeting was presided over by Andrew S. LaPenta '22, President. The members present learned with regret of the serious illness of John H. L. Giles '29 and voted to have flowers sent to him at the hospital.

President LaPenta turned the meeting over to Dr. Millard Knowlton '18, who introduced the speaker of the evening, Dr. William W. Peter '18, associate professor of public health at the Yale University School of Medicine and Public Health. Dr. Peter was well equipped to speak on the topic "China, Our Oriental Ally," having spent many years in China as a medical missionary and in various capacities with the health agencies of the Chinese Government. His fine speaking ability enhanced his talk, which those present followed with rapt attention. A prolonged question period followed, with almost everyone taking part. Many members commented that the meeting was the most interesting one they could remember. — LOUIS J. PROULX, JR., '36, Secretary, 31 Wells Road, West Hartford, Conn. JOHN A. SWIFT '27, Assistant Secretary, Billings and Spencer Company, Corner Park and Laurel Streets, Hartford, Conn.

Technology Club of Kentucky

After an extremely busy summer of welcoming new industries into the Ohio Valley section and organizing these industries for the maximum of war effort, Alumni of the Institute are now started on the winter season. Our plan of having quarterly meetings called for a meeting in the second week of January. This meeting was of the same type as the very successful one held last May. Plywood and plywood plane production were the subject and, since Louisville is fast becoming a plywood and plywood plane center of the United States, experts were available to discuss this subject.

A nominating committee consisting of Everett R. Cowen '07, chairman, Melvin Sack '28, and Thomas P. Nelligan '36 submitted names for officers for the new year. As President for 1942, Elmer A. Skonberg '29 exhibited superlative interest and energy in reviving the dormant Club. He

is to be congratulated, along with the chairmen of the various committees who have been catalysts in the new organization.

The Secretary has attempted to contact all known Alumni in Louisville and its vicinity, but he has not received replies from many. He requests that these and Alumni not contacted make known their presence, so that all notifications of future meetings will be sure to reach them. The quarterly dinners and discussions will be timely and interesting, and all Alumni in the district are urged to attend. (No dues will be solicited.) — ALBERT J. KLEMKO '36, Secretary, River Ridge, Jeffersonville, Ind.

Technology Club of South Florida

A group of members met on November 17 at the Seven Seas Restaurant to discuss ways and means of promoting and carrying out a plan of activities for the year. Those present were Frederick S. Anderson '04, Arthur Esner '21, Edward I. Mandell '21, J. Coleman Jones '23, Clarence P. Thayer '23, G. Edward Sakrison '29, and G. Murlin Drury '35. William W. Carter '93 and John J. Ostlund '35 were unable to be present. A sumptuous meal and much reminiscing were enjoyed, after which the Secretary called the meeting to order at 8:20 P.M. A motion was made and carried that the above-mentioned group of members should constitute the executive committee, to hold office for one year. Drury will serve as chairman of the committee.

The Secretary read a report of a meeting held by some of the wives of members of the Club to ascertain whether it will be feasible to organize a women's unit. The Club endorsed the plan, and the Secretary was instructed to write to Mrs. Jack Wilkinson, chairman, offering our full cooperation.

The question of holding a meeting was presented to the committee and discussed at some length. A motion was made and carried to hold a meeting sometime soon. A committee consisting of Drury, chairman, Jones, Sakrison, and Mandell was appointed. The committee was instructed to plan to hold at some convenient place a meeting, to be known as Army and Navy night. The ladies are to be invited. It was suggested that perhaps William E. R. Covell '23, a colonel in the Army, could be secured as the guest speaker.

A motion was made and carried that a new slate of officers be presented at the next meeting, if possible. The nominating committee consists of Esner, chairman, Ostlund, and Anderson.

The Secretary brought to the attention of the committee the need of selecting some member of the Club to assume the

responsibilities of getting out the club paper from time to time. We also need someone whose only job would be to supply material about the Club to The Review. It was suggested that the Secretary continue to handle the matters until someone else can be found to assume these duties.

The question of finances was brought up, and several suggestions were offered as to how we could secure needed funds. Three members present started the fund for this year with \$9.00. A committee consisting of Mandell, chairman, Anderson, and Thayer was appointed to study this matter. As suggested by the Institute, a committee to study the employment problem was appointed. This committee consists of Carter, chairman, Ostlund, Thayer, and four other members to be appointed later. — The meeting adjourned at 10:12 P.M. — CLARENCE P. THAYER '23, Secretary, 1760 Northwest 41st Street, Miami, Fla.

Technology Club of New York

Floyd E. Armstrong, Professor of Economics at the Institute, whose analyses of current events and past predictions on economic developments have proved to be uncannily correct, was the guest speaker at the annual fall smoker of the Club on December 3. More than 150 members and guests, including many younger graduates of '40 to '42, were present.

Professor Armstrong spoke on "As I See Things." He advised his audience that two basic movements or trends are developing in the world today. One is the centralization of power in our national government. The other is a drift toward some type of international union of nations after the war. "The good old days," said Professor Armstrong, "will never come back." And in the ensuing changes which our government and institutions will undergo, he urged the young businessmen to seek a larger share of the control. "The day of the innovating reformer who follows each depression is passing," he said. "Such reformers can tear down an old structure and build up a new one, but they cannot run it. They must call in the administrative type to take over." Professor Armstrong warned, however, that when the administrative type does return, he must do so as a "trustee of society."

Turning to the international scene, Professor Armstrong outlined three possible results of the war: a return to isolationism; the setting up of a fantastic "super-world" state; the four winning nations — United States, Britain, China, and Russia — co-operating in some manner to "run the world." Of the three possibilities, Professor Armstrong named the last as the most logical and the most likely.

Entertainment for the evening was carried off by Michael MacDougall, ace private investigator and exposé of dishonest gamblers and internationally famous author of *Gamblers Don't Gamble*. Mickey gave the audience a fascinating demonstration of second deals, bottom deals, fake riffles, and stationary shuffles. Before the evening was over practically everyone was uneasily recalling certain games and recent hands, and mentally questioning the integrity of his lifelong business associate, his next-door neighbor, or his fellow commuter on the 8:20.

Sandwiches and beer and informal discussions completed the very successful evening. Although the number of formal events are limited these days, activity at the Club is as high as ever. The restaurants and bar are always crowded and active membership is again increasing. — WILLIAM D. NEUBERG '17, *Secretary*, 24 East 39th Street, New York, N.Y. CONSTANTINE S. DADAKIS '34, *Publicity Committee*, 644 Riverside Drive, New York, N.Y.

Technology Club of Philadelphia

The Club started another year of action with Erwin H. Schell '12, Professor of Business and Engineering Administration at the Institute, as the guest speaker at the University Club on Tuesday, December 1, at 6:30 P.M. Seventy-two members attended the meeting, which was presided over by Vice-president Edward J. Healy '23. Henry B. Kane '24, Director of the M.I.T. Alumni Fund, outlined the progress of the Fund to date.

In his usual forceful manner, Professor Schell discussed Technology and alumni affairs. He outlined the healthy growth in alumni interest, as indicated by an increase in Review subscriptions from 5,500 in 1933-1934 to 7,902 during the past year; over 8,000 sales of the last "Register of Former Students," compared with 2,800 of the previous issue; and the increased enthusiasm at each succeeding Alumni Dinner. During the last 11 years, members of the Institute staff made 645 visits to alumni clubs, President Compton alone accounting for 106. Commenting on M.I.T. graduates in the armed services, Professor Schell stated that at present we can point to 9 admirals and 24 generals from our alumni body. Getting away from statistics, he related many items of interest concerning the important part Technology is playing in the war effort.

Mr. Kane, in discussing the Alumni Fund, said that contributions both in the aggregate and on a per capita basis were considerably ahead of the previous year. He reported that as of November 30, 7,783 contributors had subscribed \$84,500, which was 23 per cent ahead of the corresponding total a year ago, with an average contribution of \$10.90 compared with last year's \$9.60. — All members and guests left with the thought that the evening had been well spent. — GEORGE T. LOGAN '29, *Secretary*, 1000 Chestnut Street, Philadelphia, Pa. HENRY F. DALEY '15, *Review Secretary*, B. F. Sturtevant Company, Cresmont and Haddon Avenues, Camden, N.J.

M.I.T. Club of Western Pennsylvania

A very enthusiastic gathering was held at the University Club on December 3. An excellent dinner was served. A movie, illustrating the interesting or novel hobbies of people in the Pittsburgh district was shown.

A discussion was held to determine the consensus of opinion as to the desirable type of speaker for the February dinner. The group favored, if available, qualified, and permitted, a talk by a combatant lately returned from one of the active fronts, or a research talk by someone engaged in the development and improvement of a variety of interesting combatant devices. The field will be examined and efforts made to secure the best speaker available.

After dinner the crowd gathered about and swapped stories, experiences, and information in a most interesting and pleasant fashion until a late hour. President Ralph M. Ferry '12 presided over the meeting in his usual amiable and efficient manner.

The maintenance of the roster is becoming a major problem, with about a 10 per cent change of addresses within the last six months and with more to follow. All who have moved and have not advised Gilbert Reed '23 of their new addresses are requested to do so, as he is having a difficult job keeping the list up to date. — FRED W. WATERMAN, JR., '25, *Secretary*, Carnegie-Illinois Steel Corporation, 1304 Carnegie Building, Pittsburgh, Pa. GILBERT N. REED '23, *Membership Secretary*, Westinghouse Electric and Manufacturing Company, 1210 Union Bank Building, Pittsburgh, Pa.

Technology Club of Rhode Island

Thirty members and guests, including some of the Alumni recently moved into this territory, attended the December meeting of the Club, which was held on the tenth at the To Kalon Club in Pawtucket. Howard C. Fisher '09 was our host and sponsor.

The usual half hour of socializing lasted until about 7:15 P.M., and a thoroughly relaxed group adjourned to the dining room for one of the Club's famous chicken dinners. President Bill Gould '28 presided. During dinner, the Club's raconteurs presented their latest stories. Plans for a ladies' night sometime soon were discussed informally, but no definite decisions were made. The executive committee will get together and circularize the members later.

Following dinner, we all adjourned to the bowling alley and had enough enthusiasts and neophytes to form four six-man teams. We say neophytes advisedly, as some of us had never bowled with the large-sized balls which are so popular in the Middle West. Norman MacLeod '14 appeared to be the high scorer, but in general the facetious wisecracks were more effective in their aim than the bowlers. As usual, a thoroughly good time was had by all.

The new members of the group included Harry L. Pearson '22, Albert J. Puschin '28, Harry D. Crapon, Jr., '37, Eric D. Swenson '37, and Harris F. Hanscom '42. Also present were the following: Eugene E. Nelson '02, Albert C. Dickerman '05, Donald G. Robbins '07, Howard C. Fisher '09, J. Burleigh Cheney '11, Joseph W. Lovell '13, Francis B. Morton '13, Frederick D. Murdock '13, Norman D. MacLeod '14, Edward S. Esty '18, John M. Hanley '18 (and guest), Norris G. Abbott, Jr., '20, Donald E. Walch '22, John D. Eldert '27, William E. Gould, Jr., '28, George E. Colby '32 (and guest), Freeman W. Fraim '32, Leonard Shapiro '34, Edgar J. Staff '35, H. Bruce Leslie '38, Pasquale J. Pesare '40 (and guest).

The membership of the Club have been circularized for vital statistics concerning their business and engineering activities. This is in preparation of a directory to be used during the readjustment period at the close of the war as an aid in placing returned members of the armed forces. It is also in general accordance with the suggestion submitted to the Club this fall by Charles E. Locke '96, Secretary of the Alumni Association. The Secretary now has statistics on about 60 per cent of the membership. — JOHN M. HANLEY '18, *Secretary*, Post Office Box 1366, Providence, R.I.

Worcester County Alumni Association

The following account of our meeting is from a Worcester paper: "Preliminary plans to obtain post-war positions for graduates of Massachusetts Institute of Technology who are in the armed forces were made at the annual meeting of the Worcester County M.I.T. Alumni Association . . . in Hotel Bancroft. The association authorized the appointment of a Post-War Placement Committee for Worcester County to which President Orville B. Denison, '11, named William A. Wilder, '98, local U. S. Employment office manager; F. Harold Daniels, '11, Riley Stoker Corporation; Myles Morgan, '23, Morgan Construction Company; John S. Middleton, '29, American Optical Co., Southbridge and George W. Falk, '32, Independent Lock Co., Fitchburg.

"Meanwhile a six-point program for stimulating interest in the Institute's Alumni Association was outlined by Professor Erwin H. Schell, head of the Institute's department of business and engineering administration. The points included direct service to alumni in the armed forces; increased contacts between undergraduates and alumni in professional work; closer association with graduate students; encouragement of local alumni clubs; and discussion of ways and means to strengthen local clubs with alumni officials of other New England colleges. While there has been a steady increase in alumni association membership since 1934, Professor Schell said, 'it behooves all of us to give thought, one to the other, in the future.'

"Other speakers were Charles E. Locke, '96, alumni secretary; and Henry B. Kane,

'24, M.I.T. Alumni Fund director. The county association re-elected Mr. Denison president; and elected W. Franklin Baxter, Jr., '34, Southbridge, vice-president; Arthur J. Lariviere, '35, secretary; Robert N. C. Hessel, '27, treasurer. Elected to the Executive Committee were Harold O. Berry, '22, Gardner; Gordon W. Browne, '29, Leicester; Fred E. Mader, '32, Shrewsbury; Andrew B. Sherman, '06, Fitchburg; and Carl H. Wilson, '34, Southbridge.

"Others present included: Robert A. Canning, '30; Lewis Davis, '12; F. F. Donoghue, '32; Edward Depoyan, '30; Frank S. Hunt, '16; W. A. Hyde, '04; Robert D. Knight, '31; Harry M. Latham, '93; Howard R. Stewart, '17; Louis E. Vaughan, '02; and Ernest P. Whitehead, '20, all of Worcester; Howard F. Atwood, '32, Bolton; Stanford H. Hartshorn, '11; Harry S. Kendall, '04 and Roger R. Smith, '27, all of Gardner; Robert H. Brown, '22, Leominster; Charles E. Allen, '07, North Spencer and Charles B. Robba of Webster, father of Charles R. Robba, a junior at M.I.T." — ARTHUR J. LARIVIERE '35, Secretary, 7 Woodbine Street, Worcester, Mass.

CLASS NOTES

1876

The organization of Charles T. Main, Inc., completed its 50th year of service on December 31. This fact will be of interest both to the remaining few of the Class and to the graduates of later classes. After our graduation in 1876, I remained at the Institute for three years as an assistant, and for the next 12 years I was employed in the textile industry in various capacities. At the end of this time I decided to devote the whole of my time to engineering.

On January 1, 1893, an engineering association was formed with F. W. Dean under the name of Dean and Main. On January 1, 1907, this association was dissolved, and my work was continued under the name of Charles T. Main. On July 1, 1926, the business was incorporated under the name of Charles T. Main, Inc. Under this name the organization has continued and finished the remainder of the past 50 years of important service, the work covering a broad field of engineering.

The success of the organization is due in large measure to my "associates," so called, past and present. Since the beginning of the present emergency, the organization has been, and is now, engaged on several important projects for the United States Government. — CHARLES T. MAIN, Secretary, 201 Devonshire Street, Boston, Mass.

1887

Two changes of address have been received recently. Arthur Nickels announced his departure for Sarasota, Fla., where he will spend the winter. John W. Adams is already located at 198 Cortland Avenue, Winter Park, Fla., for the winter. — We regret to announce the death of John

Clarke Lee on December 16 at his home in Wellesley, Mass.

An affair of deep interest to Technology men in general and to the men of '87 in particular was the celebration on December 21 of the golden wedding anniversary of Professor Leo Rich Lewis and Mrs. Lewis with an informal reception in Professors' Row at Tufts College. Professor Lewis, who was graduated from Tufts in 1887 and has been on the faculty since 1892, married in the latter year Carrie Nichols Bullard, sister of the late Frederick Field Bullard, composer of the "Stein Song" and a dearly beloved classmate of '87. No one present on Tech night at the Pops on the occasion of the big Technology reunion in 1904 can ever forget Bullard's leading the orchestra in the "Stein Song" and the wild enthusiasm of his classmates of '87 as "the good song" was "ringing clear." May his sister and her distinguished consort enjoy many more of these happy anniversaries. — NATHANIEL T. VERY, Secretary, 15 Dearborn Street, Salem, Mass.

1888

An excerpt from a letter from George Roper, our champion mile runner, reads as follows: "I have just taken time to read the notes in The Review. It is sad to learn of the demise of one after another of our Class. I regret so much I did not see Harry Horn again before he died. Of course I remember Ivar Sjostrom. I remember clearly every member of our civil engineering class.

"Our country had plenty to be thankful for on this past Thanksgiving Day, and much has followed since then to lend us great encouragement. Our new and larger shipyard will be in operation the early part of 1943. This will mean more work and more worry, but I guess we can stand it, especially if the good news continues." George is as active as ever. You can't keep a good man still.

Another civil engineer, Addison Nickerson of Beachwood, N.J., writes as follows: "Thank you for your letter of November 24, with the clipping of your account of the dinner last summer. I fully intended to send my regrets, which was the least I could do, but I put it off until too late.

"Of myself, there is little I can say. I did help to put Beachwood on the map. It is a tract of 2,000 acres with 77 miles of streets. I built the various public buildings and about 70 bungalows and houses, including my own, which you have seen. During World War I, I was located at Camp Eustis for a year as superintendent of the procurement division, handling all building material and in charge of the yardmaster department. After the war, I returned to Beachwood and started in the building business again — surveying, and so on. I spent six years as supervisor for the geodetic control survey for the county, but this work folded up in 1940 because of war necessities, and I have done very little since, except to dabble a little in real estate.

"I have a son putting in long hours on defense work as a surveyor at Fort Dix,

and I am the proud grandfather of a six-year-old granddaughter. Time hangs rather heavy on my hands as I have led a very active life. The letdown is not very satisfying. About my only diversions are working around my place, playing chess, and occasionally fishing in the near-by river. Your clipping of the men and events of '88 was very interesting, and I have read it twice. I met Besler when we were starting Beachwood. He was president of the Central Railroad Company of New Jersey at the time, and I had business appointments with him."

The Class of '87 were noted for starting "new things" at Technology from 1883-1887, and now they are sending out Christmas cards via Secretary Very. One came to your Secretary, for which he is duly grateful.

The *Factory Mutual Record*, Providence, R.I., for November gives a very fine testimonial to the character and life work of our classmate, Benjamin G. Buttolph. The magazine also carried a likeness of him.

John Blodgett, II, with us for three years, came to Technology from Pawtucket, R.I. He passed away in Danbury, Conn., on September 26. He was with the Carnegie Steel Company, Pittsburgh, Pa., for some time and was later in New York. He attended class affairs whenever he could.

Sanford Thompson, our Assistant Secretary, wrote the following: "I have been intending to write to you, but I have been tied up with many things since returning from Washington, where I have been engaged for over a year and a half as a consultant, first to the Secretary of War, and then, when Lieutenant General Brehon Somervell took the reins, at the headquarters, Services of Supply.

"General Somervell, as you doubtless know, controls the entire vast systems of procurement, production, and distribution of all war material except airplanes. This includes the Ordnance Department, Quartermaster Corps, Signal Corps, Chemical Warfare Service, Medical Corps, and the Corps of Engineers. Since his installation and the radical reorganization and changes in personnel of these various services, there has been a vast improvement in the conduct of the various departments. Production of munitions is now proceeding with fair dispatch.

"The basic trouble previously, and not yet entirely cured, was the lack of appreciation by chief officers of the fundamental principles of modern production management. This defect reached down from the general staff. It resulted in lack of planned estimates of the dates at which items were needed; lack of proper correlation between the delivery of items handled by different branches, such as guns versus planes, guns versus ammunition, and so on; and lack of synchronization of deliveries of components of each item. Much of this has been due fundamentally, in the past, to the slowness of delivery, often through lack of early follow-up by the War Department of some one minor part which has grounded planes and delayed deliveries of tanks. At present, the

1888 Continued

chief faults causing slow deliveries are due to lack of skilled management in the War Production Board with which, in investigations for the control division of the Services of Supply, I came in frequent contact. The press criticisms of multiplicity and duplication of reports and questionnaires are well founded, except that the newspapers omit the most serious consequence — delays in production of critical material. The new controlled materials plan (C.M.P.), which is designed to correct the confusion I found last spring, will really control the distribution of raw materials, the dearth of which is now the greatest bottleneck." — BERTRAND R. T. COLLINS, *Secretary*, 39 Wiggins Street, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston, Mass.

1890

Probably most of us have seen the announcement of the awarding of the John Fritz Medal to Willis Whitney "for distinguished research both as an individual investigator and as an outstanding and inspiring administrator of pioneering enterprise, coordinating pure science with the service of society through industry." *Civil Engineering* for December refers to this medal as "the highest award of the engineering profession, devoted to the recognition of distinguished contributions in the field of applied science," and to Whitney's most notable achievement as "the creation and development of the General Electric Research Laboratory, one of the earliest of its kind in the United States."

Again the virility of '90 has been demonstrated. Franklin White is back at the Harvard Medical School, teaching medicine to fourth-year students. He is also on the staff at the Boston City Hospital. — Charles Sherman might appear to be reaping the reward of a well-spent life, as he changed his mailing address to his house at 16 Myrtle Street, Belmont, Mass. He is, but not in idleness. As president of the Belmont Savings Bank, he still keeps busy, and he is also kind enough to send in occasional clippings about class members.

From Sherman, we have for the class files the American Society of Civil Engineers' memoir of Frank Chase. This gives a new view of Chase's outstanding ability and broad philosophical point of view. To him is credited "the crusade of conservation that ultimately resulted in the enactment and enforcement of rational conservation laws that have materially extended the life of natural gas service to the domestic consumers of the southwest, and have made it feasible to extend it to the large population centers of the middle west." Credited with always being an up-to-date engineer, he also is lauded for his "keen sense of fairness, his interest in the advancement of his younger associates, and tolerance for the opinions of others, and his interest in the realms of pure science." Above all he was "a striking example of what constitutes an educated Christian gentleman."

Ernest LeSueur, urged to visit Boston, writes that no citizen can leave Canada with more than five dollars, unless for a specific, approved purpose, and it is illegal to possess United States funds otherwise. While "as good as retired," he continues to do some consulting work and war work.

After spending the early part of the evening with friends, James A. Carney died very suddenly on July 16. For 46 years he was with the Chicago, Burlington, and Quincy Railroad Company in various capacities. Graduating in Chemistry, he became an assistant chemist at Aurora, Ill., in 1891; engineer of tests in 1895; and later superintendent of shops in West Burlington, Aurora, and Chicago. During this period he handled three strikes. In 1927, he was made superintendent of the safety department. He retired in 1937, and since then had traveled extensively, first to Bermuda, then Venezuela and Central America, then down the Mackenzie River to the Arctic and to Alaska, and later around South America. He enjoyed hunting, fishing, and golf, and was an enthusiastic automobilist. A lovable fellow, he will be much missed at our reunions, which he almost always attended.

There are times when the Secretary, who has spent much of his time in the far West, realizes especially his inadequacy to fill the place of George Gilmore, who had kept so closely in touch with many of the Class. This is borne in on him now as he has met friends of Hubert G. Ripley, who passed away on December 15. Ripley had been active in his profession in Boston up to the time of his death. A former president of the Boston Society of Architects, and a member of the Boston Architectural Club, he was also a fellow and former director of the American Institute of Architecture. He was well known for his skill in freehand drawing and in water colors, and he wrote for many architectural publications. At the time of his death he was writing the history of the Boston Society of Architects. These writings are delightfully illustrated with cartoons and drawings. In one, which appeared in the *Architectural Record*, he relates how Eugene Letang, the beloved Professor of Architecture, "used to come back from lunch about three thirty — a bit foggy, nidorous with 1884 Macon for the daily critique. With a soft pencil and a few thumb smudges, he would make sketches of such loveliness that they revealed to the student undreamed beauties in his stodgy campanile or timid triumphal arch." Ripley had a wonderful command of language. He accepted invitations almost to the time of his death, and had recently talked to the Architectural Club at Pittsburgh. A true "gentleman of the old school," he was much beloved by the entire architectural profession.

Edward A. Northey died on November 17. He spent the greater portion of his business life with the New England Bureau of United Inspection, of which he became manager and from which he retired nearly 20 years ago. He had the

reputation of being "a corking good inspector, very thorough, with considerable attention to small details, and with the ability to write a good report." Though fastidious and self-contained, he was fond of fishing and hunting, but in late years he is reported as saying he "would as soon go out in the pasture and shoot a calf as to shoot a deer."

Albert F. Brown, who put the Secretary on the track of the information concerning Northey, says he himself is in good health and manages to keep busy by reading and tinkering about the house. — Frank Greenlaw gave his temporary address while he is teaching in Providence as "The Minden," 112 Waterman Street, Providence, R.I.

A letter from Bertram H. Mann states that he retired from the Missouri Pacific Railroad in 1939, and for the past eight months he has either been in the hospital or confined to his bed at home, where he was when he wrote on December 20. It is, however, a pleasure to hear that he hopes to be back at our June meetings before long. We all extend our best wishes for a very prompt recovery. His address is 161 South Elm Avenue, Webster Groves, Mo. — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 2-236, M.I.T., Cambridge, Mass.

1891

This is not our regular month for class notes, but we have requested permission to have notes this time in order to pay tribute to one of our prominent classmates, Frederick Chambers Blanchard, who passed away on December 9. He had been ill for several years and spent last winter in Florida recuperating from a serious operation. Until the latter part of his life he enjoyed excellent health. He was athletic in build, outstanding in soldierly appearance, and his chief hobby for years was golf. He was a conservative in that game, knew what he could do, and enjoyed it without trying to do something different. An enjoyable, if quiet, companion, he had the respect of his classmates and friends.

Born in Dorchester, Mass., Blanchard attended Boston schools and entered M.I.T. with our Class. He was major of the battalion in his freshman year, and he soon became well known and popular with his classmates, so that he was elected president of the Class in our sophomore, junior, and senior years. He was on the "Technique" staff and delivered the address on Class Day. He attended most of our reunions and dinners, and at our 45th reunion he easily outplayed your President and Secretary at the only recorded golf match. He was unable to attend our 50th anniversary because of ill health, and this was a great disappointment to us and to him, as he has been one of our most loyal members throughout the years. We shall miss him.

The records show that for some time after graduation, Blanchard was employed by the Ashcroft Manufacturing Company of Bridgeport, Conn., and more recently he was chief engineer and vice-

1891 Continued

president of the Rivett Lathe and Grinding Company of Brighton. He contributed to technical magazines. For years he was a member of the Wollaston Golf Club. He leaves a wife, two sons, and three grandchildren.

Just as we were sending in these notes, we were informed of the death on December 5 of our classmate David A. Ambrose. He was a loyal member of our Class and attended many of our functions, but we had not heard from him recently. He expected to attend our 50th reunion, but was unable to come, and we understand that he had not been in good health for some time. He had been with the Metropolitan District Commission, parks division, for some years but he retired from active business several years ago.

A recent letter from Will Wilder reads as follows: "There is not much news to report from this end of the line. Some research work in which I am interested is going on in the laboratory, but plans for the future are hampered by the priority situation. My son, Philip '23, is a captain in the Army Air Forces and is stationed at the classification center in Nashville, Tenn. His wife has joined him there and they are very comfortably quartered, probably for the duration. She is a member of the Gray Ladies and is very active in Red Cross work in the Nashville area. Their oldest son, Philip, Jr., whose 18th birthday came in July, is at Bowdoin College and hopes to enter the meteorological division of the Air Forces. This, as you know, is quite a highly specialized branch, and several institutions, including M.I.T., are assisting Uncle Sam in training men for this service. Their second son, Charles Willoughby Wilder, is at Phillips-Andover Academy. Of sentimental interest is the fact that for five generations, in direct line, each generation has had a son at Andover. Charles is the fifth, and the first, his great-great-grandfather, was a member of the class of 1829. This, I believe, is a rather unusual record for any American preparatory school. One of my nephews, Captain Bancroft Wilder, is somewhere on the high seas, and his brother Bolton is at the officers' training school in Fort Belvoir."

Ed Smith reports that he has been home, temporarily under the weather, but he expects to be out again shortly. He admits being interested in color photography "as an amateur," and seems surprised at the peculiar results of under-exposure. We should form a '91 Kodachrome club, as there may be others that we don't know about who have this hobby.

Eli Bird was in Boston early in December to attend the funeral of his sister Mrs. Brazer, who lived in Brookline. We are glad to hear from him and send him our sincere sympathy.

Frank Howard heard that Charlie Hanington was in the hospital, but we have no definite news at this writing. We hope it is nothing serious. Frank claims that he has a "great" great-grandson, who wears a "T" on the front of his sweater. That ought to give us something to shoot at. — We shall save the

rest of the news till the next number of The Review. — HENRY A. FISKE, *Secretary*, care of Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

1892

Notice has just been received of the death of William H. Messenger in St. Petersburg, Fla., in November. Messenger was a retired professional engineer and road builder. He was a life member of Ridgewood Lodge F. and A.M. of Brooklyn, N.Y. He served as assistant engineer in the Navy in the Spanish-American War. In the World War, he was a captain in the United States Engineers and was overseas for 18 months.

In 1936, when Wayne University in Detroit conferred the honorary degree of LL.D. on our classmate William R. Kales, who died on December 3, the citation was as follows: "Generous donor of time and skill in the solution of municipal and civic problems, he richly merits the gratitude of the city of his adoption." — CHARLES F. PARK, *Secretary*, Room 5-111, M.I.T., Cambridge, Mass.

1894

The Secretary owes an apology to the Class for failing to report in the recent issues of The Review. The excuse, for there always has to be an alibi, is absence and activity in other fields. A retired professor is supposed to be a man of almost infinite leisure, but this doesn't seem to be the case — at least in wartime. For more than a year I have been a consultant on foods to the Secretary of War. Early in September, I left for Albany, Calif., to take part in a school for operators of dehydration plants sponsored by the Department of Agriculture, as the government is calling for large quantities of dried vegetables for the Army and Navy, and for Lend-Lease. This school, with the traveling to and from the Coast, required a month.

While your Secretary was in the San Francisco region, the M.I.T. Club of Northern California arranged a luncheon which was most enjoyable. John Nowell, Austin Sperry, and the writer gave '94 the largest representation of any one Class. It was my only meeting with Nowell during that busy three weeks, and he was in his usual good form. He is engaged in numerous civilian and public services, as has been his custom since his retirement from the Pacific Telephone and Telegraph Company. Fortunately, I had more contacts with Sperry and greatly enjoyed a call, and later a dinner, with Austin and his charming wife. Before I left the city, Austin took me to lunch at the famous Bohemian Club, where I also had the pleasure of meeting Arthur E. Fowle '93, and the luncheon hour was largely spent in reminiscing about the old days at "The Tech on Boylston Street," and in comparing notes on the number, variety, and war activities of our progeny and, in the case of married daughters, their husbands. We all felt well pleased that our families are helping to win the war.

THE TECHNOLOGY REVIEW

While in California, the Secretary spent a couple of days visiting dehydrating plants in the Los Angeles area and greatly regretted that he did not have time to visit Ray Price at Price Ranch at Los Alamos and to look up other '94 men, Farnsworth, Hubby, Parnall, and Woollett, in Los Angeles. It would have been fine to hunt up Unruh, Hollister, Cousins, Mann, E. M. Parker, and Savage elsewhere in the state. The return from the Bay district was made via Seattle and Everett, with an inspection trip to Yakima. Four days after I arrived back in Boston on October 10, a second school of dehydration at Rochester demanded three weeks of attention. While I was in Rochester, the local Technology Club held a meeting. It was a great pleasure to be with Frank Lovejoy for an all too short evening.

Between November 1 and the time of writing these notes on December 22, Army work has taken the Secretary to North Carolina, Wisconsin, Illinois, upstate New York, and also to Washington and New York City two or three times. It is a busy life, but it is fine to be able to do something in the war work. No doubt there are other '94 men who are equally active.

W. S. Hulse has changed his address from New York City to 65 Tonnelle Avenue, Jersey City. — Al Tenney has done a fine job as our Class Agent on the Alumni Fund. The Fund is going to be of very great importance to the Institute, and all members of the Class should support it as generously as possible. Write to Al (with check enclosed, of course) at 3 Joy Street, Boston, or send your contribution directly to the Alumni Fund, Room 3-219, M.I.T.

It is a matter of deep regret, but perhaps to be expected, that these notes must often carry the news of the decease of some of our Class. James McCabe, who will be remembered as active in our freshman year and who was a resident of Greenville, N.C., passed away on May 7. Our sympathy is extended to his wife, through whose thoughtfulness the information was received.

The New York Times announced the demise of Clyde N. Friz, a well-known architect, in Baltimore on November 22. Since 1900, Friz had been associated with the architectural firm of Wyatt and Noltling. He designed a number of Baltimore buildings, the best known of which is probably the Enoch Pratt Free Library. Friz was born at Chester, Mich., and was 75 years of age when he died. He leaves a widow, a daughter, and two sons. He was never active in class affairs and was unknown to most of us. The Class extends warm sympathy to his family. — Although these notes will not appear until February, the Secretary will express the season's greetings to all his classmates. — SAMUEL C. PRESCOTT, *Secretary*, Room 3-233, M.I.T., Cambridge, Mass.

1895

"The day is done and the evening far spent." During a period of about 30 days, the Class has suffered the loss of four of

1895 Continued

its members. — Azel Ames, I, passed away on November 23 at his home in Yonkers, N.Y. He had been an Army officer, an important railroad executive, and was prominent in industrial circles. Azel was born in Wakefield, Mass., on January 3, 1873. He attended the local schools, and was graduated from Phillips-Andover Academy in 1891 and from M.I.T. with our Class.

Azel first began work as a civil engineer with the Boston and Maine Railroad, but he left this position at the start of the Spanish-American War to serve as a captain in the First Regiment, United States Volunteer Engineers. At the close of this war, he resumed railroading, first with the Boston and Albany Railroad, and then with the New York Central lines. He was for a time at Chatham, N.Y., at Wellesley Hills, Mass., and at Albany, N.Y. Later he went with the Lake Shore and Michigan Railroad and was stationed at Cleveland, Ohio. In more recent years, he was signal engineer of the electric zone on the New York Central lines and was stationed at Yonkers, N.Y.

During World War I, Colonel Ames saw active service as a major in the Coast Artillery Corps, and in 1939 he was retired with the rank of colonel in the Reserve Corps. At the time of his death, he was an executive officer with the Kerite Insulated Wire and Cable Company of New York. He is survived by Mrs. Ames, a daughter and son, and his sister, Mrs. William E. Norman of Groton, Mass.

Azel Ames was a man of many qualities; he was respected and honored in every walk of life. In his social life he was most friendly and courteous to all. His rounded career, including his military experiences, gave him a field of adventure, the recital of which was always a joy to his listeners. He had for nature a great love, which was much reflected in his love for all mankind. His appearance at our class reunions added a great buoyancy to these memorable gatherings.

Charles E. Birge died on November 22 at his home at 20 Oxford Road, Scarsdale, N.Y. He followed the profession of architecture throughout his whole life. He designed the building for the Bankers Trust Company in New York City, many buildings for William Randolph Hearst, and many Schrafft stores.

Birge came from Iowa. He was graduated from the University of Wisconsin in 1893, and then entered Technology. After he left Tech, he studied at the Ecole des Beaux-Arts in Paris. Returning from Paris, he engaged in architectural practice in Chicago before moving to New York. For two years he was a trustee of the village of Scarsdale, and for a time was acting mayor. No members of his immediate family survive him.

Roger James Williams, IX, passed away at his home in Canton, Mass., on December 14. After leaving Technology, he started work in the woolen mills operated by his father and partners under the name of Draper Brothers Company. Roger was prominent for years in the woolen industry, and at his death was treasurer and a director of the company.

This company started in 1856 as a fancy knitting mill and later began the manufacture of woven woolen felts used on pulp-making and paper-making machinery. During World War I, the entire product of his company went into linings for rubber boots and shoes and paper-making felts, which were declared essential products by the War Industries Board. He was a member of the board of investments at Canton Institution for Savings, and a director of Richard Briggs China Company, Boston, Mass. His social life was centered in the Scituate Country Club and the Scituate Yacht Club. He held only one public office, trustee and chairman of the board of the Canton Public Library. He is survived by his wife, two sisters, three sons, and three grandchildren.

Walter Scott Williams, X, died at his home in East Norton, Mass., on December 18. After graduation, Walter spent a year at Technology as an assistant in the Department of Chemistry. For the following three years he was assistant superintendent of H. N. Slater Cambric Works, Webster, Mass. For ten years from 1900, he was chemist and purchasing agent for the Arnold Print Works, North Adams, Mass. During 1909-1910 he managed the New York Mills Bleachery. From 1910-1913, he was a consulting textile chemist, and for a time he was associated with Arthur D. Little, Inc. From 1913-1917 he was a chemical engineer with the United States Finishing Company, 320 Broadway, N.Y. From 1917 to his death, he was associated with the Mount Hope Finishing Company at North Dighton, Mass., as chemist and purchasing agent.

During World War I, Walter had a great part in bringing out the manufacture of dyes in the United States. His principal amusements were farming and golf, the latter giving him the greatest pleasure. He wrote for numerous textile publications on subjects such as the valuation of tannic acid, improvements in bleaching cotton fabrics, and so on. An article on antimony compounds as fixing agents was translated into French and German. Walter loved our reunions. He was on hand whenever possible and took a great interest in class affairs. He is survived by Mrs. Williams and several children. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

Many more replies regarding the class book have been received. Fred Rundlet found the pictures very attractive, and he has reported a lot of incidents that occurred in our school days, particularly referring to the characteristics or idiosyncrasies of some of our classmates and teachers. Dan Richardson has closed his summer bungalow on Lake Winnepesaukee in New Hampshire and is at the Sarasota Trailer Park in Florida for the winter. Karl Pauly, now that he is retired, is finding a lot of time to devote to his hobby of geology, in connection with which he has become a rabid hunter of fossils. Winthrop Chenery is living in retirement in Los Angeles with his foster

son and wife. His health is such that he is unable to continue active work. Henry Waterman in Yarmouth, Nova Scotia, says everyone in his community is busy and, incidentally, delighted over the wonderful work of the United States Navy.

Since bananas are no longer arriving in Boston, Harry Baldwin does not have to work these days with the United Fruit Company on Long Wharf in Boston toting bunches of bananas from ship to shore, but his moments are not idle by any means, as he has duties in Swampscott as chairman of Selective Service Board 146; technical adviser of blackout committee, region 5, metropolitan area; member of Committee on Public Safety of Massachusetts; local air raid warden; and other similar activities. At the time he wrote, he was expecting to be soon on a full-time job in the war industry.

W. E. Haseltine is now a colonel, Corps of Engineers, Historical Section, Army War College, 19th and B Streets, South East, Washington. Because of increasing difficulties with government regulations, he retired from his glove business in Ripon, Wis., two or three years ago. Since his children were grown up, he and Mrs. Haseltine decided to spend some time in traveling. In the fall of 1940, they went to Central America and spent the winter, mostly in Guatemala. However, the war came along and disrupted their traveling plans. His three children are all in the war effort. Billy '34, the oldest, is a captain in the Ordnance Department of the Army. Charles, Harvard '36, is a surgeon in the Navy; and the daughter, Smith '38 and Yale University School of Nursing '41, is married to an Army surgeon. Haseltine's telephone number in the War Department in Washington is Republic 6700, extension 2526, and he and Mrs. Haseltine are fortunate in having secured a nice little house at 4606 Davidson Drive, Chevy Chase, Md., where there is plenty of room for guests. He extends a cordial invitation for any of the classmates to call upon him in Washington or to be his guests in Chevy Chase.

Admiral Bakenhus still has his proposed visit to Boston as a future event. On December 8, he spent the entire day as a member of the Engineers' Council for Professional Development Committee in consultation with Edward C. Elliott, chief of the engineering and technical section of the War Manpower Commission. His work on this committee takes a lot of time, but it is a fine committee to work with, having three college presidents among its membership. On December 5, Bakenhus was on the guest list at the winter meeting of the Society for the Promotion of Engineering Education held at the Cooper Union. It so happened that he was the only representative from M.I.T. on that occasion. Bakenhus has sent the Secretary a brochure of the meeting of the American Institute of Consulting Engineers held at the University Club in New York City on January 19, 1942. On that occasion Bakenhus had the job of presenting Professor James T. Shotwell

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of Columbia University, who gave a masterly discourse on the lessons of the last World War. This discourse, with the discussion which followed, gives much food for thought.

The Alumni Office has received a change of address for Henry K. Sears from Providence, R.I., to 3431 East Pine Street, Wichita, Kansas. There is no information available on the reason for this move, except that Henry reached the retirement age from his job as head of the department of mathematics in the Providence schools, and then followed the advice of Horace Greeley to "Go west, young man."

Bradley Stoughton has spent much time in Washington as chief of the heat treating equipment section of the War Production Board, having his office in the Railroad Retirement Building. — The Secretary regrets to report that last January, Hattie Gates, one of our fine loyal lady members, had the misfortune to suffer a fall, which resulted in broken bones and a long period of hospitalization. The last good news, however, is that she is back at her teaching job in a Boston high school.

There has come to the Secretary a memoir of the American Society of Civil Engineers which forms a part of Volume 107 of the *Transactions*. This memoir pays a fine tribute to our late classmate Charlie Paul, and his outstanding record as a construction engineer. Another publication that arrived is a reprint from the *Journal of Dairy Science* of November of an article by H. C. Lythgoe entitled "Phosphatas Testing as Used by the Massachusetts Department of Public Health for Law Enforcement Purposes." For the benefit of the ignorant, it may be added that this test is used for determining whether milk has been properly pasteurized, and it has proved very valuable in the prosecution of milk dealers who have violated the law. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

Charles-Edward Amory Winslow is quoted by the New York *Sun* as follows: "Our draft army is probably the most physically and mentally competent large body of young men ever gathered together under any flag." The article says of Winslow: "Behind his statement is a career of about forty years of professional and humanitarian effort in the service of public health. Dr. Winslow has been curator of public health at the New York Museum of Natural History, director of health education in the State and has been associated with the Rockefeller Foundation in public health research and education. He has written a wide shelf of books on subjects in his field, conducted innumerable surveys, contributed to countless forums and conferences. He has furthered wider participation among college students in health-building sports and he has been a pioneer in both positive health and preventive medicine."

"He is equally authoritative in the field of mental ills and their prevention.

You can drop into the Public Library, get a few notes on Dr. Winslow and be prepared to meet and vanquish any loose talker who says our soldier boys are a lot of cripples."

Lester Gardner has been emulating college presidents in securing large gifts to the Institute of the Aeronautical Sciences, of which he is executive vice-president. Mrs. Daniel Guggenheim gave to the institute the large estate at Sands Point, Long Island, which was formerly owned by her husband, Daniel Guggenheim. The estate has an exceptionally fine English type of manor house and a stable and garage building, which is so large that it can be used for laboratory purposes. The surrounding grounds of 162 acres are landscaped as a park. To support this large property, Lester persuaded Glenn L. Martin, the aircraft builder, to give the institute \$500,000 worth of the stock of his company. Lester writes that he will be glad to receive any '98 men at his new estate when the rhododendrons bloom again.

We quote from the Boston *Globe* of November 11: "Roger W. Babson, nationally-known economist . . . has been elected to the board of directors of the Columbian National Life Insurance Company of Boston, the company announced last night. Babson, besides being chairman of the board of Babson's Reports, Inc., is vice-president and director of the Gamewell Company, vice-president and director of the Newton Trust Company, a director of the Eagle Signal Corporation and of the Rockwood Sprinkler Company and is a member of the general council of the Ford Hall Forum."

The September issue of *Mining and Metallurgy* announced that Frank F. Colcord had been made a member of the Silver Producers' Advisory Committee. — Not long ago at his request and expense, we sent to the Honorable Edgar A. Weimer a transcript of the addresses of '98 men. We received a wonderful snapshot of him smoking a big cigar. A Christmas greeting was on the back of the picture.

We have previously noted the death of our distinguished woman classmate, Isabel Bevier. We now have at hand a dispatch from Urbana, Ill., printed in the New York *Times*, which gives a fuller account of her career: "Miss Isabel Bevier, Professor Emeritus of Home Economics in the University of Illinois College of Agriculture, died . . . in her home here at the age of 82. Miss Bevier founded the Department of Home Economics at the university and was Professor of Economics and head of the department from 1900 to 1921.

"She also was vice director of extension work in Illinois from 1905 to 1921 and was chairman of the southern branch of the University of California Department of Home Economics from 1921 to 1923. Miss Bevier was a lecturer in home economics at the University of Arizona in 1925 and was Professor of Home Economics and acting vice director of extension work in home economics at the University of Illinois from 1929 to 1930, when she retired.

"During the first World War she was chairman of the Department of Conservation for the Illinois Division of the Women's Committee of the Council of National Defense, and was Home Economics Director for Illinois under the United States Food Administration. Herbert Hoover appointed her Home Conservation Director of the Food Administration in 1917. She was the author of books, articles and bulletins on home economics.

"Miss Bevier was born in Plymouth, Ohio, the daughter of Caleb and Cornelia Brinkerhoff Bevier. She received a Ph.B. degree from the University of Wooster in 1885 and a Ph.M. degree in 1888, and also studied at the Case School of Applied Science, Harvard Summer School and the Massachusetts Institute of Technology. She won honorary D.Sc. Degrees from Iowa State College and Wooster College. She began her career as a high school principal in Shelby, Ohio. Later she served as professor of natural science at Pennsylvania College for Women and as professor of chemistry at Lake Erie College, Painesville, Ohio. Miss Bevier assisted the Department of Agriculture in nutrition investigations from 1894 to 1899. She was a member of the board of editors of *The Home Economic Journal* and a member of the jury of awards of the Chicago Exposition of 1893."

Henry F. Scott gives his address as Box 45, West Falmouth, Mass. His summer address has been in Falmouth for some time, and his winter address was in Framingham. — ARTHUR A. BLANCHARD, *Secretary*, Room 6-421, M.I.T., Cambridge, Mass.

1902

Our Class has lost another member since the last notes were written. Fred A. Poole died on November 5. He had made his home in Barrington, Ill. He had been engaged in business in Chicago as president of the Production Instrument Company and vice-president of Poole Brothers. He left his wife, Helen Lathrop Poole, and two sons, Frederick A., Jr., a private in the Army Air Corps at Greensboro, N.C., and Paul L. The following words of appreciation of our classmate were received from Mr. Visin, Vice-president of the Production Instrument Company: "Fred A. Poole died on November 5. His passing takes from the world a great personality — one beloved by all those who knew him."

"Mr. Poole was not only the possessor of unusual inventive talent and initiative, but he was also a builder of men. In both the companies in whose development and progress he played such important roles, his innate modesty and studied self-effacement kept his own personality well in the background. Yet his contributions to industry and the development of his associates merit permanent recognition.

"Fred A. Poole was born in Chicago, Ill., on August 11, 1877. He was educated in the Manual Training School in Chicago and at M.I.T. He then engaged in the printing business and devoted most of his time and thought to plant operation and production. He later became interested in

1902 Continued

the Production Instrument Company where, up to the time of his illness, he had developed many outstanding counting machines worthy of the name 'instruments.' He was never content with products that were 'good enough.' His constant effort was toward perfection. His search for better design, better materials, and improved manufacturing processes was indefatigable.

"Time after time Mr. Poole held up new instruments that did a good job, but in which he could detect flaws. He carefully studied the function of each part, and redesigned the instrument to achieve smooth effortless operation. Mr. Poole was equally interested in men, particularly his associates and employees. On numerous occasions he gave assistance to employees to help them through various misfortunes, but he always did this in such a way that the people were not aware of it. Everybody who knew him not only respected him and admired him but loved him; and the people of his organization are completely grief stricken."

Thanks to Patch the following information can be passed on: Lydia G. Weld, XIII, is employed at Oakland, Calif., where she is busy checking plan alterations at Moore's Dry Dock Company. Saylor, IV, is supervising a new Pratt and Whitney plant at East Longmeadow, Mass., for Alfred Kahn. F. A. Nagle, Roseville, Calif., reports that his son, who was graduated from the University of Nevada, is now a lieutenant in the Army. Nagle's daughter is in her sophomore year at the University of Nevada. Bert Sherman has a third granddaughter, Sally Earl, born on September 18. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston, Mass.

1906

Within a few minutes of closing the office for Christmas, I suddenly remembered that class notes were due. The following is submitted, therefore, to maintain our unblemished record for having at least something under the heading of 1906.

Classmates will be interested to know that Frank and Mrs. Benham went to Richmond, Va., for Christmas week to visit their son, Walter, who is attending officers' training school at Fort Monroe.

The Secretary's son, who became a flying cadet on August 1, is now located at Ellington Field, Texas, and has just started his first course in preparation for a commission as an Air Corps navigator. The family had hoped the boy would be home for Christmas but it was not possible. Thus, no doubt, we were in the same position as many classmates whose family circles were not complete. That, of course, subtracted something from the usual holiday spirit. In spite of this, we still had the same Christmas message which was given to the world some 1,900 years ago, and we hope that as Christmas, 1943, is celebrated, peace on earth and good will toward men will apply to a larger proportion of the world's population than it does at the present time. — JAMES W. KIDDER, *Secretary*, Room 801, 50 Oliver

Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

John Davis, III, who has been in Washington with the United States Bureau of Mines since 1924, as chief engineer in the information division since 1928, retired from government service on September 1, primarily because of poor health. He returned to the home at Siasconset, Nantucket Island, Mass., which has been in his family since 1852. He has no business connection at present, but he is doing some volunteer service in civic and community affairs on Nantucket. John is married but has never had any children. — In The Review of November, 1940, we wrote of Harold S. Duncan, who at that time was located in Warren, Ariz., as assistant agricultural engineer in the government's soil conservation service. He was transferred to Portland, Ore., in that same month and remained there until February, 1942, when he resigned from government service to accept a position in the engineering office of the Miami Copper Company at Globe, Ariz. He and his wife are once again living in their own home at 151 South Fourth Street in Globe.

Since 1914, Fred Morrill, I, has been with the Ferro Concrete Construction Company at Cincinnati, Ohio, as a civil and designing engineer. For one school year he was a special lecturer in structural engineering at Cincinnati University. That was his second experience in teaching, in view of the fact that from June, 1908, to June, 1911, he was professor of civil engineering at Pei Yong University at Tientsin, China. Fred's home is at 5125 Paddock Road, Cincinnati. He has a daughter who was graduated from Mills College in Oakland, Calif., in 1939 and is married to Irwin Abrams, who received a Ph.D. from Stanford University. Fred also has a daughter attending Marietta College, Marietta, Ohio. — A gracious note received in November from Carl Trauerman expressed his pleasure at reading the account of our 35th reunion in the November Review and his regret at not being able to attend. He wrote: "I traveled with Senator Pat McCarran of Nevada, Senator Abe Murdock of Utah, and several governors and congressmen on the mine tax hearings at Reno, Salt Lake City, and Denver in July. This trip also took me to Chicago for one day, and I had a telephone conversation with John Frank. I am still hitting the ball for the Mining Association of Montana, and I am interested in chrome and manganese mining. By government edict, the Ruby Gulch Mine, a very successful gold mine of which I am president, was shut down." Carl's address is 505 Montana Standard Building, Butte, Mont.

In the December Review we told of Edwin James. On December 15, Jim Barker kindly sent me a copy of the *Weekly Bulletin* of the American Viscose Corporation, of which Jim is a director. The bulletin commented at length on an article written by Edwin James in an issue of the

Foreign Commerce Weekly. The article dealt with the Pan American Highway, which is gradually nearing completion. — The Secretary publicly thanks those men of our Class who sent him greeting cards and messages at the time of Christmas and New Year's Day. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

The Acushnet Process Company of New Bedford, Mass., of which Philip E. Young, II, is president, was awarded the Army-Navy "E" Award on November 24 for "outstanding work in producing war equipment." A letter from Colonel S. E. Whitesides of the Chemical Warfare Service read as follows: "The Chemical Warfare Service needed eyepiece leakage testing apparatus for the noncombatant mask in a hurry. There were no specifications. The job was difficult, and someone said impossible to complete by the required date. The Acushnet Process Company tackled the problem and did the job promptly. . . . We appreciate your fine co-operation. . . ."

In ordinary times Cy's company manufactures the renowned Acushnet golf balls, which many of us so often drive into the rough, as well as other rubber products such as gaskets. From the pictures of several large factories at the head of Cy's stationery, the golf ball division appears to predominate, which is only natural considering the importance of the product. Golf balls are taking a back seat, however, for Cy writes: "The golf ball division is now busy on war work, although we are recovering a few old balls for our trade. We sell only through the golf professional, as you may know. The Acushnet line of golf balls during the last few years has come to be an important factor in the golf ball field."

"Howard Fisher, II, was over to see me last week. As you know, he is running the Central Engineering and Construction Company in Pawtucket. He is going to do some work for us in setting up some new equipment we are getting."

The Class has been honored by the fact that Art Shaw, I, has been elected to the Executive Committee of the Alumni Association. He will serve until June 30, 1944. (See the December Review, page IV.) Incidentally, Charlie Main was chairman of the Nominating Committee that made the nomination. In the May number of The Review, Art told about the activities of his firm, Metcalf and Eddy, and of his two sons, Dick '35 and Bob '42. Art says that the only change which has occurred since that time is that Dick has been promoted to the rank of captain in the Corps of Engineers and is stationed at Fort Belvoir, Va. Art also wishes to report that he has not as yet been drafted. The Secretaries also wish to acknowledge Art's helpfulness in ferreting out class news and sending it along.

Laurens D. Dawes, Harvard '35 and Harvard Business School '37, son of the Review Secretary, is now a senior lieu-

1909 Continued

tenant in the Navy and a deck officer on a combat transport. Laurens, who is somewhere in the Pacific, reports that he has seen many interesting places, some seldom seen by tourists. He states that the ship's assignments have been tough, and that the Japs are tough but we are tougher. Jane is now teaching at Friends' Academy in New Bedford, Mass. She replaced a teacher who married one of Cy Young's employees, and Jane sees Dick Young once in a while.

Word has been received only recently by the Alumni Office from the brother of Milton S. Clark, that Milton died on October 4, 1939. As we recall it, Clark worked in Bill Hall's chemical laboratory and was in Metallurgy. Your Secretaries have not been able to learn anything further. Clark's address from 1915 has been Jamestown, N.Y. — The Alumni Office was notified of the death on March 6, 1941, of Robert C. Kerr, VI, of Beverly Hills, Calif.

From Mex Weill came the following letter: "You will probably remember that four years ago I organized a company for the purpose of developing an advanced method of airplane construction, using plastic-bonded plywood. After passing official tests, we expanded our operations and were fortunate in finding two modern factory buildings here in Port Jervis, N.Y., situated on the Delaware and within half a mile of an airport. To give you some idea as to what we are doing, let me say that airplane parts built according to our methods are hollow. The surfaces, being of a special nature, are designed to carry the loads, and we do not depend on internal supports as is common practice today. This fundamental and direct approach is the thing that intrigued me and has interested so many aeronautical engineers." Mex also notes that his boy, Bob, a Brown University alumnus and till now connected with the C.I.T. in Florida, is with him. Bob has always been a favorite of your Class Secretary. I looked up Mex and Helen when I came to New York in 1921, and Bob began to call me Paul on sight. He was then about six or seven, and we've been buddies ever since.

Mollie Scharff wrote from Washington that he is now a lieutenant colonel and "deep in the throes of P.R.P. and about to be plunged equally deep into C.M.P." In his letter Mollie enclosed a clipping from the Washington *Star* telling of the award given to Ed Merrill by the Greater National Capital Committee of the Washington Board of Trade for his successful handling of the 1942 finance campaign dealing with the difficult housing problems in Washington. Ed is president of the Capital Transit Company. Mollie speaks of seeing Brad Dewey now and then and tells us that Bob Keeney is in the nickel division of the War Production Board. Harry Rapelye '08 was chief of the division till he became chief of the equipment bureau in the recent W.P.B. realignment. Mollie asks: "Who else of 1909 is in Washington? Let me know and I'll be glad to look them up and send in some news." That's a good lead, classmates.

Mollie is chief of the P.R.P. unit, W.P.B. liaison section, priorities and allocations branch, resources division, headquarters Services of Supply.

Since writing the above, Mollie reported further: "I have run into John Nickerson, who is here as a management representative on some sort of Congress of Industrial Organizations — American Federation of Labor — management — public advisory board on labor relations in the W.P.B. One of these days I'm going to arrange a class luncheon. Your letter suggests that I will be here 'only for the duration' and asks for a permanent address. My own idea is that 'the duration' is going to be a long, long time. Accordingly, I have pulled up stakes in New York completely, moved all my possessions here, and expect to stay until the Army moves me somewhere else. As for after the war, I haven't an idea what I'll be doing or where I'll be." Mollie lives at 235 Second Street, Southeast, Washington, D.C.

Tom Desmond is so eternally active that we are always finding something about him to put in the class news. In an article appearing in the New York *Herald Tribune* of November 29, Tom urged building interests and communities to begin planning to meet the postwar demand for housing, for it is estimated that between 900,000 and 1,200,000 new dwellings will be needed for the decade after the war. There is ample authority for private corporations to deal with housing problems under the terms of the 1941 Desmond-Mitchell Urban Development Act.

Paul Wiswall writes: "On my way home from the Orient in 1920, after the other War, the good ship *Oxfordshire* of the Bibby Line, a sister ship to the ill-fated *Zamzam* that flew the Egyptian flag and was formerly the *Leicestershire*, brought me from Ceylon to Suez. I happened to sit at the captain's table and got on so well with Captain Stanley that until his death in 1939, we carried on a regular correspondence. Even yet, I hear now and then from his widow. A letter that came the other day tells of the difficulties of keeping house in England. Mrs. Stanley lives in Hampshire, west of London, in the country. When we think of little gas or of sugar rationing, it might be well to know of things a widow almost 70 does to help in her small way in England. She wrote: 'One of our jobs is to go "wooding," doing our best to save coal. Many arduous tramps we have had, dragging or carrying such "trunks" from the woods as we could manage. Our equipment isn't of the best, and the saw is too tiny, making the job most difficult. We struggle along, however, making it an amusing occupation! [The exclamation point is not mine but this courageous English woman's.] Also the garden has to be kept in order and vegetables planted for spring and winter use. Add to that our needlework for the troops and for our own nieces and nephews. Our days are not lazy ones.'" — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cam-

bridge, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 235 Second Street, Southeast, Washington, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1911

If, by any chance, you missed the article on page 27 in *News Week* for December 7, look it up right away — just as I did at O. W. Stewart's suggestion. In the center of the page is a fine picture of General MacArthur and our George Kenney, I, a lieutenant general. The sub-caption reads: "Kenney . . . played a new game of leapfrog with MacArthur's troops." The story is titled: "Leapfrogging Plus Fortress Use at Low Levels Shapes New Type Air War Over New Guinea."

"The story of Allied air supremacy in the Southwest Pacific," the article begins, "goes back to last August when a short, bulky Nova Scotian in the U. S. A. Air Forces, with a bristling pompadour and a positive manner, took over the Allied air command in that area. He was Lt Gen. George Churchill Kenney and he began his work with two assignments: to clear the Japs out of the air over New Guinea and to use the air power thus gained to help land troops and to harry the foe. As the 53-year-old veteran flier put it: 'Our job is to put holes in the enemy's air umbrella and to throw an umbrella over our own forces at the same time.' . . . By mid-August the Japanese had forsaken the skies of New Guinea, but Kenney knew that an air mastery was only part of the answer. 'Anybody who thinks we haven't a fight on our hands had better roll over and start dreaming again,' he remarked and went ahead with new plans."

Continuing, the article describes one of Kenney's plans — the mass flight of an American army from Australia to New Guinea, one of the most spectacular air transport jobs of the war thus far. "These landings of troops and supplies," the article continues, "permitted Kenney to introduce the unique Army leapfrog technique, one of New Guinea's contributions to the science of war in impossible terrain. As the American troops advanced in the jungle, food and supplies were dropped to them from the air. Then, in leapfrog fashion, further airstrips for landing the transport planes were built by the troops as they went along the jungle trails, each one nearer the Japanese beachheads at Buna and Gona."

"Kenney also put into effect another new operational technique — that of using heavy bombers from low altitudes to insure maximum results. The Air Forces' reaction to Kenney's daring methods was summed up by a veteran flier: 'If anybody had said five years ago that Flying Fortresses would be operating from below 1,000 feet and strafing warships and general targets from 50 feet, we'd have claimed they were crazy.'"

"What prompted Kenney to order the Fortresses down from their usual bombing perches at 23,000 feet was the simple but discouraging fact that they weren't hit-

1911 Continued

ting many Japanese ships — and when they did hit them they usually didn't sink them. The big Boeings, designed for high-level, had to come down. Since then the B-17s have plastered Jap ships on nearly every raid. . . . Thus, out of this unconventional flying, there was emerging a new theory of air tactics."

A dispatch from Australia, filed by the United Press, announced that General MacArthur had "awarded the purple heart decoration to Lt. Gen. George C. Kenney, commander of Allied air forces in the southwest Pacific, in recognition of meritorious service in inventing a new fragmentation bomb used effectively against the enemy from levels as low as 75 feet on Japanese barges and landing points in the Buna area and in some of the strafing raids on Lae and Salamaua, in which many planes were destroyed on the ground."

Small wonder that Rickenbacker in a dramatic interview with the press in Washington just before Christmas described Kenney as being "one of the hardest-hitting airmen any place in the world."

Other Army news of interest shows that 1911 can now boast two brigadier generals, for Sid Spalding, III, and Lawrence Weeks, VI, are now thus chevroned. Spalding is still in the office of the Assistant Secretary of War in Washington, and Weeks is at the Coast Artillery Corps school at Fort Monroe, Va. Congratulations go also to Dick Ranger, VIII, advanced from major to lieutenant colonel, and to Ted Van Tassel, X, upped from captain to major. Dick, in the Signal Corps, is now at Lakeland, Fla., while Ted, in the Chemical Warfare Service, is currently assigned to the gas mask division, Fisk Tire plant, Chicopee Falls. He writes that he recently met John Scoville, IV, at the Springfield depot. John, who resides in West Hartford, Conn., is now with Sanderson and Porter, engineers, 52 William Street, New York City.

Sons and daughters of classmates feature this month's Navy news. Hats off and a low bow to Ensign Dorothy Ell of the WAVES, daughter of Carl S. Ell, XI, President of Northeastern University, and Mrs. Ell, who has been made officer in charge of enlisted women at the Great Lakes Naval Station in Illinois. Congratulations and best wishes go to Franklin Perry Seeley '42, an ensign, and his bride, the former Edith Marjory Alexander of Newtonville. Nat and Louise Seeley's son and his mate picked a grand day for the wedding — the seventh day of the eleventh month!

"The dead *will* come to life sometimes and this is one case." Thus does George Forristall, II, start a mid-December letter from Houston, Texas. "For the past four months," he continues, "I have been sales promotion manager, aviation division, for Brochsteins, Inc., of Houston — formerly showcase and fixture manufacturers but now going into 100 per cent production on plywood and molded plastic airplane parts and subassemblies for Army Air Corps prime contractors. During this period I have covered about

10,000 miles, visited Wright Field in Dayton twice, and have also called on about 40 aircraft makers. Now the business is beginning to come in in a big way.

"About the family — I don't believe that you knew that my wife, Ann, died on July 3. It has been a great loss to all of us. The kids are fine. Barbara has been married over seven years and has a boy and two girls; George David was graduated from Rice Institute in 1940, married in 1941, and is a mechanical engineer in the Cameron Pump division of the Ingersoll-Rand Company in New York; Margaret is a senior at Rice; and Bashford is a sophomore in mechanical engineering and is also in the Naval Reserve Officers' Training Corps at Rice. I'm well, thank you, and hope this letter after all these years was not too much of a shock." Those of you who had been favored to meet George's wife know full well the loss he and his family have sustained. I remember what a fine mother she was to her youngsters. I was entertained at their home in Houston during trips to the Southwest as Alumni Secretary in the mid-Twenties.

There was a good picture of Burleigh Cheney, II, in the Boston *Post* of December 10. He was described as "recently named new regional salvage manager for the WPB in New England." In answer to a letter, he wrote: "My new job as regional manager for the conservation division of the War Production Board is most interesting and indeed a busy one. In words of one syllable, it means that from my office here at 17 Court Street in Boston I am expected to assist the salvage managers of the six New England States 'to get in the scrap' and to assist indirectly in the allocation of the critical materials that may indirectly come out of that scrap."

"Having been connected with the New England Council for a good many years, I have had the advantage of acquaintances in all this region and now, in my work in the six states, I see all my friends doing a perfectly grand job in the war effort. Working with all of them, I find that this organization is a perfectly swell group and is doing a job that all New England, and more, can well be proud of. I feel it a distinct compliment to be added to that group in an official capacity and you may be sure that I will do my utmost to deserve the place."

Ban Hill, I, President of the Baltimore Transit Company, was named in early December as chairman of that city's postwar planning committee, in conformity with a recommendation of a subcommittee of the 19-member board. "In selecting Mr. Hill," the mayor said, "the committee has chosen the very man for the place, as he has been most helpful in the preliminary work already accomplished." That's very fine, Ban, and we know you and your mates will accomplish much. Speaking of postwar planning, my mates in the Worcester County Alumni Association of M.I.T. honored me in mid-December with re-election as president for a second year. One of my first official acts was to appoint a five-man postwar place-

ment committee for Worcester County Alumni. Fred Daniels, VI, is a member of the committee.

Your Secretary is about to go back to his old love — industrial engineering. I have been granted a leave of absence as secretary of the convention and publicity bureau of the Worcester Chamber of Commerce, effective January 15, for the duration or longer. I have accepted an appointment as special representative of the George S. May Company, industrial engineers, 122 East 42d Street, New York City. My territory is central and western Massachusetts and adjacent sections of New Hampshire and Vermont, so I'll still live at 82 Elm Street, Worcester. — ORVILLE B. DENISON, *Secretary*, 82 Elm Street, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1914

Among the '14 men serving in various government advisory capacities is Seymour J. Spitz of Newport Industries, Inc. Spitz is a member of the executive committee of the chemical plant facilities industry advisory committee. This committee is concerned with the problems of chemical manufacture, particularly "the concentration of present facilities wherever possible in an attempt to conserve money, materials, manpower, and time."

Ted Gazarian has moved his headquarters from Boston to Cambridge, Mass. He is engaged in one of those war activities that we should not ordinarily think of — the importing of sheep casings used by the packers for the canning of frankfurters and sausages for the armed forces overseas.

Classmates associated with the Bell Telephone Laboratories still continue to develop new ideas which result in the granting of patents. Affel has had another granted on a two-way signal transmission system, and Wentz has had one granted on an alternating current generator. Affel has one of the outstanding records among members of the Bell Laboratories in the number of patents issued to him. This is particularly unique in that for some time Affel's principal work has been that of an administrator. The psychologists tell us that it is very seldom that a person achieves what Affel has. He enjoys the reputation of being a very able administrator and at the same time shows high inventive genius. But then, he trained as a member of 1914! — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

1915

I am sure you will all share with me the sentiments in the following letter that I wrote to our classmates who are in the service of the United States: "Wherever you are, whatever you are doing, you have the sincere wishes of the Class of 1915 for good health and good cheer. We salute you with pride, and your spirit is the power of example for the rest of us here at home. At the Christmas season

1915 Continued

we pay especial tribute to you who serve. Yours for a quick victory and a lasting peace!" This letter was sent to Virginus E. Clark, Alexander G. Gillespie, James D. McIntyre, and Gerald B. Robison — colonels; James A. Tobey, lieutenant colonel; William C. Atwater, Ralph W. Mendelson, Clive W. Lacy, and Thomas I. Steere — majors; Charles L. Brand, rear admiral; William H. Smith, commander; Henry L. Leeb, Nelson Slater, and John E. Williams — lieutenant commanders.

Herbert D. Swift is now Senator Swift from the seventh district of New Hampshire. Herb says: "It was a tough fight, but I made it — as a Republican senator in a Democratic district. So it will be Senator Swift for the next two years." We're proud of you, Speed; keep up the good work. You may be governor or even president!

John Sharp Williams is president of the National Association of Insurance Commissioners. He has many years of experience in back of him and has served the Mississippi Association of Insurance Agents as follows: five terms as national councilor, 15 months as executive secretary, and two terms as president. He served four years as chairman of the Mississippi Insurance Commission. For the past six years he has been insurance commissioner of his state; served two terms as chairman of the executive committee of the National Association of Insurance Commissioners (1939-1940); and last year was the vice-president of the N.A.I.C. Congratulations to you, John, in your new position.

The American Bank Note Company, 70 Broad Street, New York City, writes us: "Referring to your letter of November 3, the only information we have to give you at this time about George H. Lynott is that he went to the Far East in the fall of last year on a business trip for the company, of which he is a vice-president. Mr. Lynott is not in the armed services. After a short stop in Hong Kong, he went to Shanghai; to be able to get back to Hong Kong, the only boat he could get was one that was going to Manila. While he was there waiting to make connections to get back, the war broke out. We have been unable to get any information about him other than that he is a prisoner in Manila. We are naturally all most anxious for news about Mr. Lynott, and if we get any word we shall be only too glad to pass the same on to you." We sincerely hope no serious harm has befallen George Lynott, and that we shall soon have some good news of his safety.

Charlie Norton recently came up from his sheep ranch, "Vineyard Downs," on Martha's Vineyard, off Cape Cod, to spend an evening with me. In his bread-and-butter letter, he wrote: "You were most generous and thoughtful to invite me to hear Dr. Von Bergen's lecture and to meet your business associates. The trip was much enjoyed and appreciated. After I left you, I shopped around and had a leisurely lunch with Abe Hamburg. It was good to see him, and I am happy to hear his company is progressing. I purchased a separator and am delighted with

it. It's another milestone on our road to independence, and we're feeling pretty snug right now in our cozy furnace-heated house, burning fuel that grows in abundance on the place. You don't have to wait until summer to pay us a visit. Our guest rooms are heated, and all guests are enthusiastic about our week ends."

There ought to be more and more little Andy Andersons. Here are excerpts from two letters from him. On July 2, he wrote: "I wanted to get away over the Fourth, but it looks now as if we must keep going at the navy yard. I received the copies of *The Review* which you so kindly sent me. I should be glad to see you when you make your next New York trip. I read in *The Review* that Sam Berkowitz is now an angel; we must see that show. When you get in town, call me at the Brooklyn Navy Yard contractors for dry docks, and ask for Andy at the Jersey steel yard."

Then on October 26 we received a letter from Andy as follows: "Everything is the same here in New York, but I am wondering if you have been here during the past few months. I dropped into the office of the Mason and Hanger Company the other day, but Howard King was out. I haven't seen him since the reunion. I am still with the contractors for dry docks. Believe I told you that Billy Smith, a Navy captain, had been transferred to other duties, and W. M. Angus '17, also a captain, is now in Bill's place. Chris Wolfe has a subcontract at the yard, and I see him now and then. He looks very well and has changed little. Remember me to George Rooney, and tell him I've seen Charlie Creighton a few times this past year. See that *The Review* is sent to me, Azel, and I'll be seeing you all soon — surely in 1945."

The absence of our regular and usual class notes in the December issue showed the interest that our classmates and their families really take in these notes. Several around Boston telephoned me, and several around the country wrote to me. Of course, to keep this column going monthly I need material, so why don't more of you do what the ever faithful Jerry Coldwell has done in this letter, written from Detroit: "I noticed that the last issue of *The Review* contained no '15 notes. I presume that either you went to sleep and didn't get them in on time, or you didn't have any news. On the assumption that the second reason was to blame, I'll see what I can do. I flew out here last night, December 8, and checked a job we have running. This evening I head for Chicago and then south, checking jobs as I go along. With luck I'll be home the end of next week, and then I have to drop down to Pittsburgh for one day before Christmas. Jobs are all very interesting but cannot be discussed until the war has been safely buttoned up. My plans for going out of the country a couple of months ago were changed at the last moment. That is just as well, I guess, because that particular place is very unhealthy right now. There seems to be a lot of lead poisoning there, and it isn't taken by mouth either.

"At a dinner of the American Society of Mechanical Engineers recently, I saw Durkee, II, and many other Technology men not in our Class. Harold Coes, the incoming A.S.M.E. President, is a vice-president in our outfit and a member of the Class of '06. . . . Here I am in Chicago. You certainly have to be careful in moving around the country these days to make hotel reservations, or you sleep in the gutter or some such place. I got caught in Dayton a couple of months ago and had to sleep in a rooming house, possibly of questionable nature. The next day I dug up an assistant manager of a Dayton hotel who formerly was at the Palmer House in Chicago, and then my troubles were over. The hotels do not even honor your request by telegram for reservations, but these are minor troubles compared with those of some of our classmates."

We are now up to about 85 per cent of our quota of contributions for the Alumni Fund. This is an excellent showing, for which I thank you generous and loyal givers. Now if you will send in some class notes you will really have done something to "help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

1916

Those who attended our 25th reunion a year ago last June will remember Frank Hubbard and the speed with which he covered the tennis court. Those of us who played with him will remember the nasty chop shot which won his championship. Frank broke into print on Friday, December 11, when the *New York Times* carried his picture. (By the way, Frank, you'd better start getting rid of that double chin.) He is filling a newly created position as director of purchasing and subcontracts for the Brewster Aeronautical Corporation. Frank joined Brewster in 1936.

Alex Brest, well-known member of Course I, is now a major in the Army Corps of Engineers. He writes as follows: "During the last three years my company has constructed and is now completing five naval air bases in the Southeast. I was a member of the operating committee until I resigned in September to accept a commission of major in the Corps of Engineers. I am assigned to an engineering aviation regiment whose duties are to build airdromes overseas and in the theater of operations.

"The work is very interesting, and when the history of this war is written and the work of the engineers recorded, I am sure that we shall all be proud of their contribution toward victory. With my kindest personal regards and best wishes to all our friends." — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

1917

Lucius Tuttle Hill of Brookline, who has lent geniality and color to several of our '17 gatherings, is now placing the force of his personality back of the vic-

1917 *Continued*

tory fund drive in the First Federal Reserve District. He has been appointed assistant executive manager of the committee serving under the chairmanship of William W. Paddock, President of the Federal Reserve Bank of Boston. The committee has been organized to stimulate increased purchases of government bonds by savings and other institutions, corporations, trust funds, and larger individual buyers of securities. News notices in the Boston papers referred to Loosh's past overseas service in the Coast Artillery, with his graduation from the military service as a captain. He was once with the Flintkote Company as merchandising manager, but for some years has been engaged in independent financial research work.

Ted Bernard has been appointed an area representative for the War Production Board, with headquarters in Boston. Bob Marlow is now assistant purchasing agent of Waterbury Clock Company and is temporarily living at the Kingsbury Hotel, Waterbury, Conn. The company is engaged in manufacturing fuses and other war products.

Dix Proctor arrived in Cambridge in December on such short notice that the Dean of Students was unable to break previous engagements and see that he was properly entertained. After a brief luncheon with Henry Strout and the Class Secretary, Dix continued on his tour north, interested currently in taking and refusing orders for bearing metal and in giving good advice on selection and use of it.

For purposes of record we note that three sons of 1917 are registered in the Class of 1946: George A. de Mars, Stephen W. Moulton, and Robert H. Stebbins. Our congratulations are extended to Paul, Bob, and George for these sturdy olive branches. — **RAYMOND STEVENS**, Secretary, 30 Charles River Road, Cambridge, Mass. **PHILIP E. HULBURD**, Assistant Secretary, Phillips Exeter Academy, Exeter, N.H.

1918

Jack Hanley is still getting answers to the notes he sent out, so the following is from him: Maggie wrote his promised letter for the class notes during the latter part of October while I was in the Middle West seeing what I could do to "maintain reasonable fire safety" at operations forging bomb shells, making K-ration, Link trainers, and so on, at various war production plants we insure. Maggie wrote as follows: "Life right now is full of surprises and uncertainties for all of us, and few can be dreamers faithful to their dreams. Last summer I did get pretty much away from it all by holing up in my log cabin in Jaffrey, N.H., and writing a book called 'Balanced Personality.' One chapter is still unfinished, but the subject is one which inflames me, and who would deny that in this year of terror it should be given consideration?"

"My daughter is out of college and is working in the library at Swarthmore College, where she is delighted by the atmosphere and the people, though the

same verb would scarcely apply to her reactions to Philadelphia's summer climate. The two boys are both still at Yale. The elder graduates in February and as a member of the Enlisted Reserve will go immediately you can guess where.

"A few weeks ago I was asked to do a job for the State Department in Washington, so I regretfully abandoned my M.I.T. classes, which have been a joy to me. We are closing up the house; the lovely lady already has a job; and a friend has taken the dog who has been such a good companion to all of us these seven years. With suitcase in hand, I headed for the national madhouse and a very uncertain future. Still, there is a look of deep tranquility on my face. We are still alive, healthy, and unafraid, despite doubts and the slippery pathways that are bound to assail all until we devise a civilization based on decency and good will. Right now fraudulence seems to be an international virtue." — Maggie wants us to continue to send his mail to Room 5-117, M.I.T., as he has no permanent address in Washington.

Under the letterhead of J. O. Ross Engineering Corporation, 350 Madison Avenue, New York, Sax Fletcher wrote as follows: "I do not know where your letter has been since September 15, but I do know that time passes rapidly these days. I was in Boston for a convention of the Technical Association of the Pulp and Paper Industry and went over to the Institute to see Maggie and Bat Thresher '20. I found that Maggie had just left for New York to give one of his usual inspiring lectures, and that Bat Thresher had found speaking to the freshmen such an ordeal that he had gone to the hospital for an appendectomy. Bob and Mrs. Van-Kirk attended the convention and expressed the hope that they could get to the 25th reunion.

"In my wanderings around the country I stopped in to see Al Williams, who is now general manager at the Columbus plant of the Curtiss-Wright Corporation. I found him ensconced behind a big desk in a very large office, and I spent a delightful day going through the plant with him. The 'regulars' I see are Ev Rowe, who usually succeeds in taking my money away at bridge, and Clarence Fuller, who, I believe, finds us a good customer for Foxboro equipment.

"My personal situation has not changed a great deal, except that all of our work is connected with the war. Core ovens, magnesium and aluminum heat treat ovens, and dryers for vegetables are a sample of the things we are making. My family is growing up, the oldest being a senior in high school this year. He will probably be in the Army next year. My oldest daughter is away at school, and the two youngest manage to keep the house lively. Mrs. Fletcher and I are looking forward to the 25th reunion and hope that conditions will be such that it can be held."

More from Jack Hanley: I saw Charlie Dow and his family rushing by the "pill-box" in Harvard Square on the day of the Harvard-Dartmouth game, and on the

way back from the game I saw them again in the subway. The second time I "bleated" at him about class notes, and he has written the following in his usual modest way. I hope he saves enough from the tax collectors to bring the whole family to the 25th reunion (when held).

Charlie wrote: "It would take a heart even harder than mine to ignore your latest appeal for a line from me. And I may say that I am considerably set up that anyone should show the interest you have shown in my doings. I warn you, however, that this will be as dull as the average talk on civilian defense. The last year and a half of my life have been a nightmare of government forms and regulations, dissatisfied customers, and alternate surpluses and famines of the chrome compounds with which I try to eke out a living for my gang. But I realize that 90 per cent or more of the Class can write this same story.

"My son has just turned 16, and so I do not expect to be confronted with 'consent papers' to sign for his enlistment for another 12 months. He has some hopes of prying his way into our alma mater in due time, provided of course that I can hold out enough from the tax collectors. He isn't, however, much more of a genius than one would expect a son of mine to be. Hence it may well be that the Committee on Admissions may save the Dean's Office from heartaches in his case. My daughter has passed her 11th birthday and naturally enough considers herself an adult now. For some reason which passes my understanding, in spite of all the years my wife still lives with me. And, more unbelievable, she is still able to smile on occasions. And there you have the essence of nearly half a century of existence."

Thanks to Bill Wills for the following: "I see by the papers that T. P. Wright, Vice-president of Curtiss-Wright Corporation, as a member of the National Advisory Committee for Aeronautics, is now in England making a survey of the airplane production there and will soon report back to this country, particularly as to whether they know how to make a few things better than we do — or vice versa. He is one of our most successful graduates, a product of the Course in Architectural Engineering, from which he enlisted in naval aviation in 1918 and thence went to the Curtiss-Wright plant. Sumner Wiley is still acting director, region 1, of the National Housing Agency, and is now located at 24 School Street in Boston."

What about the Alumni Fund? As our Class stood on November 13, 67 per cent of our quota of contributors had sent in subscriptions, and we had paid 39 per cent of our money quota to the Fund. Try to make these percentages higher.

Let's all look ahead to a week end at Weekapaug, R.I., about the middle of June. The new Weepakaug Inn is a dandy, and I know that we shall have a good time. Transportation from New York and Boston is not difficult, as cars are always meeting the trains coming into Westerly

1918 Continued

from both directions. Save some money from the tax collectors for this reunion. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Your Secretary received a card from George R. Bond, Jr., 127 West Broad Street, Paulsboro, N.J., in which he writes: "I see by the visitor list that you were at our laboratory [Catalytic Development Company] at Marcus Hook last week. I was sorry not to have had a chance to say hello. I have been working with Mr. Houdry ever since he came here in 1930. He is a great fellow. We seldom see any of our classmates around this section. I am always interested in the '19 class notes in The Review, although I seldom contribute. I am married and have four children; my oldest boy is a sophomore in high school. I take part in quite a few local activities and am president-elect of our Kiwanis Club. Our company has contributed very largely to the present aviation gasoline production and is also working on ingredients for synthetic rubber. I should like to attend the 25th reunion and hope the war is over by then."

Louis J. Grayson, a major, writes from Washington: "I am very busy trying to enjoy life as a major in the Army, and at the same time I'm doing what I can for the war effort. Beyond that, there's little to report." Commenting about the 25th reunion, he says, "Mixed, if any." — A card was received by your Secretary stating that Walter M. Howlett, also a major, is overseas in the Services of Supply. — Charles W. Hyde writes: "I am going to work for the Sperry Gyroscope Company in Brooklyn in the industrial engineering department, leaving Day and Zimmerman after eight years of service."

Dr. Reginald S. Hunt writes from 10 Bonmar Circle, Auburndale, Mass.: "I am trying to do my own work and that of two confreres who are in the Army Medical Corps. I am too busy to have any other news, and the only people I see are patients and their families." As to ideas for the 25-year reunion, he writes: "I won't have any ideas until the present work lightens considerably."

The following changes of address have been received: Ray H. Bartlett has moved out of Newton Highlands, Mass., and now resides at The Fairfax, 4614 Fifth Avenue, Pittsburgh, Pa. Lawrence B. Cahill has moved from Hollywood, Calif., to 5800 Carlton Way, Los Angeles, Calif. Moacyr R. Dias resides in South America with the address of Rua Guadalupe 256, São Paulo, Brazil. Harry A. Kuljian has moved from Ridley Park, Pa., to 131 Raynham Road, Merion, Pa. T. Morse Lloyd's address is New York University, Box 45, Station 135, New York University Heights, Bronx, N.Y. Henry E. Wilson has been promoted from commander to captain and is at the Navy Yard, Boston, Mass. — EUGENE R. SMOLLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y.

GEORGE W. MCCREERY, *Assistant Secretary*, 131 Clarendon Street, Boston, Mass.

1921

The total number of the Class having commissions in the armed forces of the United States is now 98, or 11 per cent of the 890 listed as members of '21.

John J. Winn, Jr., X, commercial manager of the Portland Gas and Coke Company for the past six years, has been commissioned a major in the Corps of Engineers, according to a note received from Clate Grover, Secretary of 1922. Jack has received considerable notice in the public press, as recounted in these columns, for his notable achievements in the gas and electric utilities. Most recently he has been a member of the industrial equipment committee of the American Gas Association, vice-president of Portland's East Side Commercial Club, and a member of the Oregon state board of education.

Ira P. Jones, II, was graduated into the Corps of Engineers as a first lieutenant after he had finished the Tullahoma air field in Tennessee, where he had formerly been a builder of homes with C. B. Kelley and Company of Nashville. Charlie Locke '96, Alumni Secretary, who sent this information, continues: "He reports that it was about as hard to get into the Army as it is to get into M.I.T. He saw foreign service in the first World War and had some preparation for his present duties. He further says that he has a red-headed 18-year-old boy who may not get to the Institute but who has all the makings of a hot pilot."

Richard Donovan has been promoted to the rank of major general, and is the second of the Class to reach that rank. Alfred B. Quinton, Jr., II, and Stanley L. Scott, I, have been made brigadier generals, so there are now four of this rank on our records. Franklin O. Carroll has been promoted to colonel, and so have Frederick S. Dellenbaugh, Jr., VI, Robert R. Neyland, Jr., I, and George W. Outland, II. George M. Herringshaw and L. George Horowitz, I, are now lieutenant colonels. John A. Scott, VI-A, has left the General Electric works in Schenectady, and is a captain of Ordnance. In the Navy, John D. Crecca, XIII-A, has been promoted to captain, and Donald W. Randolph, II, is now a lieutenant commander.

We spent a very delightful time with Dugald C. Jackson, Jr., VI-A, on a recent visit to the arsenal where he is executive officer. Dugie lives on the post with his family in quarters which abound in historic lore. His oldest son is an ensign in the Navy and the next oldest will graduate from Yale this year. A welcome letter arrived after our visit announcing that Dugie had received his promotion from major to lieutenant colonel. The letter continues: "Thanks for the news of Dave Woodbury, VI-A. He was a classmate of mine at Harvard before the last War and at M.I.T. afterward. I was somewhat instrumental in getting him to decide on VI-A. Timbie had tried to sell him the

idea, but Dave remained cool until he came down to Lynn and dropped in to see me at the Thomson Club. That was a mistake because he went away convinced as the result of the combined efforts of Coffin, Buckner, Shaw, Wetsten, Gilbert, Chutter, Wood, Chilcott, and Jackson. Maybe Bill Timbie didn't do so badly; after all, it took nine of us to sell Dave the idea."

Robert M. Felsenthal, X, writes that his company, Sears International, was a casualty to shipping and export license troubles, and he is now in the purchasing department of the RCA Manufacturing Company, Inc., Camden, N.J. Bob lives at 7 Surrey Road, Melrose Park, Philadelphia.

Arthur G. Wakeman, II, is receiving congratulations on his appointment as chief of the pulp and paper branch of the War Production Board. Art will be remembered for the very active part he took in the 1941 reunion. He is on leave from his managership of the Fox River Paper Company and has been with the W.P.B. since March. Art returned from the last War to graduate with us and then went back to his native Wisconsin, starting with an architectural firm specializing in the design of paper mills and then as an engineering draftsman with the Beloit Iron Works. In 1924, he became associated with the Kimberly-Clark Company and rose to assistant superintendent. Art's home is in Appleton, Wis. He is married and has a daughter Frances, who is 11. His hobbies are hunting and yachting, but we doubt that he has time to ride them very hard in view of his statement that he has used vacation time in the last ten years to visit practically every paper mill in the United States, Canada, western Europe, and Scandinavia.

Edmund G. Farrand, VI, and Herbert C. DeStaebler, XV, are among many of the Class who have not let their war activities interfere with alumni support of Technology's program. Ed and Herb are respectively the Chicago and St. Louis heads of the local alumni regional scholarship committees. Ed is secretary and general manager of the United Conveyor Corporation, and Herb is purchasing agent of the Lambert Pharmacal Company.

Irving K. Peck, X, is president of the Binghamton Gas Works, which maintains a most attractive headquarters on the principal business thoroughfare in downtown Binghamton, N.Y. Irv was not available during our last stay in his city, and we regret missing the opportunity to renew old ties.

Richard W. Smith, XII, geologist for the United States Bureau of Mines, Tuscaloosa, Ala., appears in print as a contributor of a letter to *Life*. Wrote Dick: "Your story and pictures of Dahlonga, Ga., brought back memories of the days when, as state geologist, I used to stay at the Smith House. I recognize in the pictures men I knew who were willing at any time to drop their work and show me a mine and then insist that I 'stop by for a snack to eat.' I wrote the text of the sign about the first gold mine. . . .

1921 Continued

"Much more could be said about Dahlonga: Crown Mountain with its scars of abandoned gold mines; and the vision of a meeting of the Dahlonga gold miners in 1849 to vote on whether to go to the new gold fields of California. The Government assayer pleaded with them not to go and is credited with being the first to say, 'There's gold in them thar hills.'" It has been a long time since Dick and his neighbor, Jim Cudworth, XII, director of the University of Alabama School of Mines, have sent us a joint report on the state of the Deep South.

William R. Hainsworth, V, President of the American Society of Refrigerating Engineers, was a member of the advisory committee for the National Power Show at Madison Square Garden, New York. Bill is vice-president in charge of engineering for Servel, Inc. Howard F. MacMillin, II, and the Hydraulic Press Manufacturing Company exhibit were missing from the show.

Saul M. Silverstein, X, X-A, Vice-president of the Rogers Paper Manufacturing Company, Manchester, Conn., reports seeing the following at the fall meeting in Boston of the Technical Association of the Pulp and Paper Industry: John J. Healy, Jr., X, Monsanto Chemical Company, Boston; Albert E. Bachmann, X, Mississquoi Corporation, Sheldon Springs, Vt.; Oscar F. Neitzke, X, X-A, Hollingsworth and Whitney Company, Waterville, Maine; Russell H. Savage, X, Mead Corporation, Chillicothe, Ohio; and Arthur G. Wakeman, II, of the War Production Board, who was one of the speakers.

Nomads of the month and their new addresses are Norman F. Patton, IX-B, 40 West 55th Street, New York, N.Y.; Bruce F. Rogers, X, 21 Hillcrest Lane, Rye, N.Y.; George R. Steininger, I, 1097 Merrill Street, Hubbard Woods, Ill.

Whether or not the groundhog fore-shadows more winter weather, warm up the typewriter, pen, or pencil, and write to the boys in uniform and send all the news to your Assistant Secretary. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 1000 Passaic Avenue, East Newark, N.J.

1922

Bill Mueser's committee on the class scholarship fund has mailed to all members of the Class an attractive notice and description of the fund. We wish to call this worthy subject to your attention and urge that you take suitable action promptly. Now is the time to get a good head start on this fund.

Ray Burrus has written that he is a major in the Army Air Forces and has been on duty since April 22. Ray, Jr., is a freshman at Technology this year. This gives the major another distinction in the annals of our Class.

Promotions are occurring in the engineering field as well as in the armed forces. Bartow Van Ness, Jr., formerly

assistant to the chief engineer of the Safe Harbor Water Power Corporation in Baltimore, Md., has been promoted to the position of chief engineer. He is adequately equipped for this position, since he was the company's electrical engineer responsible for the design of the power plant when it was built at Safe Harbor. We wish him outstanding success in his new job.

Your Secretary read with considerable interest in the last issue of this periodical over the signature of Cac Clarke that the Class of 1921 lays claim to the honor bestowed by the appointment of Phil Coffin as superintendent of the new Queens plant of the Aluminum Company of America. We can not blame 1921 for claiming credit for the success of this illustrious son of M.I.T., yet we submit to our unprejudiced readers that, while Phil may have had a few years of immature association with the Class of 1921, it was his association with us in obtaining his master's degree in 1922 that really did the trick. It was during his last year at college that he was exposed to the erudition, polish, and good fellowship of the Class of 1922, which instilled in Phil those admirable qualities which have been responsible for his outstanding success.

Frances Clark, metallurgist for the Western Union Telegraph Company, is doing war work as consultant for the War Department at the Frankford Arsenal. She commutes between her two jobs in Philadelphia and New York.

We regret to report the death on December 16 of Isadore Olef, whose home was at 129 Columbia Road, Dorchester, Mass. We extend our sincere condolences to his family. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. C. YARDLEY CHITTICK, *Assistant Secretary*, 77 Franklin Street, Boston, Mass.

1923

Ray Bond, our Secretary, is absent for a few weeks. Before he left he asked me to care for the class notes. Believing Ray's record of being the best Class Secretary should continue unbroken, and having nothing to do except sleep seven hours out of the 24, I agreed. I hope you will pardon my inexperience in such a responsible position.

The Alumni Office reported 16 address changes during November. Many of them were of a military nature and others were connected with war work. If you fellows will send in a brief account of your activities, such as can be disclosed at this time, I am sure the rest of the Class will be glad to hear from you.

We had a letter from Richard C. Kleinberger. He is out of the country in charge of some electrical installations, and he is looking forward to the day when he will come back to what he considers civilization. — Dave Skinner, XIV, is now plant manager for SKF Industries, Inc., is located at Philadelphia, and is quite enthusiastic about his new work. Dave and I happened to meet each other

at the recent conference of the National Association of Manufacturers in New York City and had an enjoyable hour rehashing class activities.

O. T. Radcliffe has reappeared upon the scene, after the personnel office reported him as missing. He says the report was greatly exaggerated as he was within 20 miles of the Institute at all times. He has joined the staff of the Boston Manufacturers Mutual Fire Insurance Company as field engineer, traveling in Connecticut. During a trip there a few weeks ago he met Al Redway, II, who is now vice-president of Farrel-Birmingham Company, Ansonia, Conn.

Next June marks the 20th anniversary of the year we were graduated. In normal times we should have a reunion and a chance to check up on the other fellow's contributions to the perpetuation of mankind, the size of his bald spot, and the increase in his waistline. Several weeks ago our respected President, Bob Shaw, polled many of the Class regarding advisability of trying to hold a reunion, either to coincide with Class Day on January 30 or at the customary time in June. The consensus of opinion was that the fellows are too scattered and much too busy this year, and that it would be better to postpone this most desirable gathering until the war is over. Then we shall have more time to do the job as it should be done. As a substitute, small gatherings were planned in New York and Boston for Alumni Day evening.

Many of the Class remembered the Secretary and Acting Secretary with Christmas and New Year's cards, for which we thank you one and all. — HOWARD F. RUSSELL, *Acting Secretary*, 71 Catlin Avenue, Rumford, R.I. HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree, Mass. JOHN M. KECK, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

1925

This is not a bad time of the year in which to discuss a matter that will be of more than passing interest to the Class. I refer to the matriculation at the Institute of sons or daughters of '25 men. Doubtless some of the more mature members of the Class have already had that experience, but this period, from the 18th year after graduation on, should see an increasing number of such enrollments. I must admit that our class files do not have even a complete record of the marriages of our members, let alone the number and the ages of children. Nevertheless, it will be most interesting to know that eight, or ten, or whatever number of sons of '25 Alumni are members of a given current class at Technology.

In these busy times, I don't expect to get a large number of replies to an inquiry of this nature, but it would be helpful if those of you whose sons have already matriculated, or for whom you have definite plans in the next year or two, would write in briefly, telling of what class they were or are to be members and what courses of study were selected. Information coming in will be reported

1925 Continued

from time to time, and, further, will be made the subject of a report at the next reunion which conditions allow us to hold. Let us hope that the year 1945 will see peace already here, or so well assured that we can make plans of this sort!

Willard Gardiner's wife phoned me recently to let me know the complete story of his transfer to Washington. As I told you previously, he has been for a number of years in charge of the time-and-motion study department of Sears Roebuck's Boston mail-order division. When he went to the capital, it was not known how long he would be there, or what his position would be. Mrs. Gardiner tells me that he has received a permanent appointment (that is, for the duration) as a captain in the control division headquarters, Services of Supply. Willard received his commission on November 27. He is on leave from Sears. As there are many Technology men in Washington, including a good-sized group of '25 men, he should be able to find congenial company in any time off that may come his way.

It is notable that the M.I.T. Club of Western Pennsylvania prefers '25 men as secretaries. A previous incumbent was Charlie Boardman, and the present scribe is Fred W. Waterman, Jr. This is one of our most active district clubs and deserves applause for its efforts, which include Friday luncheons and a series of meetings on topics of current interest. I had the pleasure of attending one of these luncheons a number of years ago when I was in Pittsburgh on business. They are extremely worth while both socially and professionally. — **HOLLIS F. WARE**, *General Secretary*, 3 Aquavia Road, Medford, Mass. **F. LEROY FOSTER**, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge, Mass.

1926

Early in December, Nela Park of General Electric Company issued the following news release: "Promotion of George J. Taylor, prominent industrial lighting engineer at General Electric's Nela Park, to the post of wartime lighting engineer at the company's Atlantic Division, New York City, has just been announced by the G.E. lamp department. In his new position, Taylor will work closely with the many government war production authorities who recently have been transferred from Washington to the New York-Newark area.

"Devoting the past two years almost entirely to wartime industrial lighting, Taylor has traveled some 150,000 miles throughout the U.S., has played a leading role in lighting more than 100 million square feet of war production factory areas. He has figured prominently in the design of such outstanding lighting installations as prevail today in Curtiss-Wright, Consolidated, Douglass, Pratt and Whitney, and General Motors aircraft plants. One of these projects involved the lighting of a mile-long windowless war plant where Taylor's fluorescent lighting recommendations today are a distinct feature of that advanced structure.

"Taylor's new responsibilities call for intimate contact with consulting engineers, electrical contractors, and factory engineers engaged in the design, construction and alteration of war plants both large and small. His presence in New York City puts at the disposal of war production men a wealth of first-hand experience which Taylor has gathered in helping war plants to increase production, improve quality of workmanship, reduce spoilage, and improve employee health and morale through proper lighting. Widely known in the electrical as well as the industrial world, Taylor has been in constant demand as a speaker before engineering, contractor, and manufacturing groups. In addition to delivering talks on industrial lighting, he has been a regular contributor of feature articles on wartime illumination to leading trade papers. His paper on the lighting of large factory areas with fluorescent lamps was one of the highlights of a recent Illuminating Engineering Society convention.

"Born in Chicago in 1903, Taylor after receiving his early education in the Midwest entered Armour Institute of Technology where he was graduated with degree of Bachelor of Science in 1925. Later at the same institution he received his E.E. in electrical engineering. Previous to this, he took post graduate work at Massachusetts Institute of Technology where he received his degree of Master of Science.

"Taylor's first job was in a Chicago steel mill where, between his studies and during vacations, he served as an inspector of electric motors. His first permanent position was with the former Cooper Hewitt Company of Chicago. After two years in service and sales engineering for that concern he spent five years with the G and W Electrical Specialty Company, Chicago, as designer and estimating engineer. Taylor then moved to Hoboken, N.J., where he served for nearly seven years as head of G.E. Vapor Lamp Company's commercial engineering department. He was transferred to the G.E. lamp department at Nela Park late in 1939.

"Taylor is married. With his wife Olive, daughters Karen, 9, and Joy, 14, he has made his home at 1027 Yellowstone Road, Cleveland Heights, Ohio. The Taylors will take up temporary residence in New Jersey until a permanent home in the East can be established."

In an article on prominent Philadelphians who had sacrificed their careers to serve the government for the duration, the *Philadelphia Record* recently included Henry W. Jones.

The article described Jones as follows: "35-year-old MIT graduate who gave up job as industrial relations manager of the Atlantic Refining Company to take charge of the training-within-industry program here for the duration. Jones helps industrial plants organize classes for the skilled men and women they will need in future months."

Kenneth C. Hawthorne died on November 15 after suffering a stroke while

watching a night air raid demonstration. Hawthorne was head of the inspection department of the Seth Thomas Clock Company in Thomaston, Conn. He wrote *How to Get Ahead in a Defense Plant* and a treatise on combating gas attacks in civilian areas. — **JAMES R. KILLIAN, JR.**, *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1934

It is with a deep feeling of sorrow that we learn of the death last February of Erskine R. Kelly, an Army lieutenant. He made a reconnaissance flight off the coast of Florida in a land-based plane. When the plane failed to return, a search was organized which lasted for two days. No trace of the plane or of its three occupants was found. Kelly leaves his wife, Priscilla Young Kelly, and Erskine R. Kelly, Jr., who live in Birmingham.

Another passing which will be deeply felt by all of us who knew him is that of Dr. Millard F. Manning. We could not obtain full details of his death but did learn that it took place last June. Dr. Manning was with the University of Pittsburgh.

A note from Harold C. Leighton, a lieutenant, brings his record up to date with the following information: "I am on a leave of absence for the duration from my job as assistant superintendent of the Beckett Paper Company, Hamilton, Ohio, and I am stationed at an Army flying school in Alabama as post chemical officer. I married Dorothy J. Shelhouse of Hamilton, Ohio, in June, 1941. Hope to get overseas before long to do a little scrapping." When Harold mentioned a leave of absence, he meant exactly what he said, for he had become an indispensable member of the Beckett organization. Bill Beckett and Valentine Friedrich '22, who is general superintendent of the company, think very highly of Harold and will have a place open for him when he returns.

Dick Bell is now Lieutenant Richard Bell of the Air Corps, and he is in officer training service in Florida. In September he wrote that he was undergoing a six weeks' period of training there, with the expectation of going into the Air Service Command in Texas later. He was having his time fully occupied from 5:00 A.M. to 8:00 P.M. In addition to the training, he was serving as a student officer and had to do some additional instruction work in that capacity. He was very enthusiastic about his work and the training he was getting. He left his wife and children back home in Gleason, Tenn.

Kevin Malone, formerly underground superintendent at the Surcease Mining Company, Oroville, Calif., is now superintendent of the company's Spud Patch placer operations in San Bernardino County, Calif. He is being addressed at Atolia, Calif. When we got as far as the spud patch, we thought for a minute that Kevin had become a farmer.

Bill Wood sent a Christmas card for all his friends in the Class. It was a reproduction of the insignia of his division — a ferocious lion guarding an aircraft car-

1934 Continued

rier encircled by airplanes. The illustration was designed by Walt Disney. — Leonard Shapiro has just joined the staff of the Warwick Chemical Company of Warwick, R.I., where he will work on the research and development of new products for the textile industry. His previous position was plant chemist for the Interlaken Mills at Fiskeville, R.I.

By a strange coincidence, I ran into Wally Wise on Thanksgiving Day in Plainfield, N.J. My wife was paying me a visit over the holiday, and we were about to have Thanksgiving dinner at one of Plainfield's better culinary establishments. I had moved ahead in the waiting line to pick up our reservations, when my wife addressed me as "Jink." Wally happened to be standing close by. Upon hearing the name "Jink," he turned to Mrs. Callan and said, "Could that by any chance be Jink Callan?" Kit assured him that it could be no other. Wally had his good wife Alice and his baby, Peggy, with him. Peggy was celebrating her 13th birthday — that is, 13 months. We had a fine little reunion then, and carried it on to a more complete discussion of old times at Wally's house at a later date. Wally is now purchasing agent for Kingston-Conley, manufacturers of electric motors in North Plainfield, N.J. His home address is 525 Terrill Road, Fanwood, N.J.

Gordon Pearson has left his job as office manager for the Colgate-Palmolive-Peet Company in Toronto and has joined the Navy as an ensign. He is located somewhere in Florida. — Dean Dadakis is chief inspector for the Oxweld Acetylene Company.

Mr. and Mrs. Robert C. Becker announce the arrival of Madeline Purdie Becker on August 10. Bob has been with the Chile Copper Company in Chuquicamata, Chile, for some time. — Ed Wemple, whose engagement was announced in an earlier issue of *The Review*, was married to Ruth Ripley White, daughter of Mrs. Dana Quimby White of Stamford and Mr. W. Lee White of Fairfield, Conn. The ceremony took place in Stamford on September 20. — Samuel Untermyer, a Navy lieutenant, was married on November 25 to Joan Sylvia Gray, daughter of Mr. and Mrs. Arthur Gray of New York City. The wedding took place at the Coral Gables Country Club in Florida. Sam was then stationed in Miami.

Shortly before the notes for this month were forwarded to *The Review*, I received from Larry Stein and John Newbegin two letters which brought a piece of heart-rending news to the members of the Class. Tuffy Emery has been killed in action. These two letters, along with an excerpt of a letter from General Theodore Roosevelt, give the story so well that I shall make no attempt to paraphrase them. I know that every one of us will feel very proud of Tuffy, and his loss will be a further inspiration for us to exert all our efforts toward eliminating the barbarians who killed him.

Larry wrote: "It grieves me that the first time I write any news for the class

notes it must be sad news about one of our very best-loved classmates. Bob Emery, much better known to most of us as Tuffy, was killed in action on November 8. As nearly as I have been able to piece together, it happened at Oran, but that is only my personal guess. The enclosed is an excerpt from the letter that General Theodore Roosevelt wrote to Bob's mother. It tells the story better than I can. The last sentence of the letter expresses the sentiments of all of us who knew him well."

The excerpt from General Roosevelt's letter read as follows: "Everyone has spoken to me about him, officers and men. They all loved him. During the offensive he was everywhere carrying his Tommy gun. A dozen times bullets flicked the dust by him. His example steadied and inspired our troops. Finally we were fighting near the crest of a hill. The advance was held up by a machine gun — without a moment's hesitation Bob moved on it. A burst caught him and he fell dead. No one died with greater glory. He has left a very large hole in our lives that never will be filled."

Newbegin wrote: "I was pleased to get your card which came today. We have been out of contact with each other for some time. I am sorry, but this is no Christmas letter. I have intended to write to you for several days, but it is a chore I have managed to postpone. The men in the Class will be very sorry to learn that Tuffy Emery was killed in action at Oran. Mrs. Emery writes that she has had some wonderful letters from many of the officers in Bob's division. For strength of character and personality, he was the greatest man that ever lived. All that we win or preserve in this war will not make up for his loss. No man could have been more generous or considerate or sympathetic. He certainly got deep under the skin of the people who had the privilege of being close to him.

"Tuffy came from a military family. His dad is a general and is in charge of a camp at Macon, Ga. He has a brother who was graduated from West Point in 1940, and, when I last heard, he was in the Pacific. His mother has taken the tragedy like a soldier, and her one hope is that we come out of this mess with the right kind of a peace so that Tuffy and many others will not have died in vain.

"I'll try to give you some dope on some of the other boys. Johnny Westfall is overseas. He can receive mail, but mail does not come out. In his last letter to his mother, he said that he was the commanding officer of his company. He expected to be able to write again in about six months. — Al Rogowski is all wrapped up in a new research and test building which he has engineered. He is in the boiling pot right now because our plant engineer dropped dead recently, and the company wants Al to take the job. It carries plenty of responsibility, but Al hates to leave the new building before things are well organized. I'll let you know how things come out. Al is not the iron man he used to be. He was in the hospital for repairs three times last fall.

— Charlie Lucke lives in his plant and goes home to eat, sleep, and worry about where he is going to get some more help who can tell a wrench from a wrench.

"As for myself, I am still in the experimental division of the Worthington Pump and Machinery Corporation. I am going to jump into the sea of bliss with a little school teacher whom I met this summer. I expect to delay the splash till June so that Helen can finish her school year. I have been disqualified for military service. I had an operation on my back last spring, and three vertebrae in the lumbar region of my spine have been fused into one. I spent a pleasant two months in bed strapped to a steel brace and a more pleasant two months at home recuperating. It was a long stretch to be laid up, but I was back at work two months before a human would have been. The operation has been a success. There has been a slight reduction in my range of movement, but I can come within eight inches of touching the floor. I have no limitations, but I can't convince the Army. My doctor says I'm fit for service, and I made a try for the mountain troops but there is a rule — probably written in 1912."

Well, fellows, it has taken three months to collect this much news, and that is a sorry state of affairs. If you have any letters you have received from other members of the Class and the contents are not too personal, please send them along so that some of your other friends will have the pleasure of reading them. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, Chile Copper Company, Chuquicamata, Chile, S. A.

1937

At the meeting of the American Society of Mechanical Engineers at the Hotel Astor in New York on December 3, I met John Nugent, II, who was spending a week's vacation in the New York area in general and at the Hotel Astor in particular. He is still with Arthur D. Little, Inc., and is doing mechanical research work. He seemed to be in excellent health and in high spirits, and he wanted to be remembered to all you fellows wherever you are.

The lists being published by *The Review* of those of our men who are in the services are remarkably complete and up to date. Looking through them, I could see only two changes in rank which would apply, and those were for fellows who had just been promoted. If your own rank is wrong or if you are in the Army, Marine Corps, Coast Guard, or Navy and your name is not on the list, let us know and we'll put it there.

Charles R. Gidley, Jr., and Alden Ulrich of New Haven have announced their engagement. The wedding is to be early in the spring. Henry J. Rugo, a lieutenant, and Faith Weil were married in New York on November 24. William B. Penn and Libby Katze were married in Boston on October 25.

Gilbert W. Winslow, I, of 83 Sumner Avenue, Springfield, Mass., was killed in

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the fire in the Coconut Grove in Boston on November 28. Gilbert was widely known throughout the four western counties of Massachusetts as a safety engineer for the Lumbermen's Mutual Casualty Company. Mrs. Winslow, the former Elizabeth Monument of Newton, Mass., was still missing at the time of this writing. This was a tragedy which will long be remembered. It was indeed an unfortunate occurrence, the like of which we hope will never happen again.

Your Assistant Secretary carries on from here. — Rupert Lewis, an ensign, writes in from the Washington Hotel in San Francisco that in the November Review we mistakenly had him attending the Naval Supply School at Harvard, while all the time he was getting additional technical background in the Radiation Laboratory at M.I.T. Our apologies to him. Rupert writes as follows: "One way to stimulate a little letter writing is to publish the wrong dope. When I saw you last April, I had just come from a radio engineering course at Bowdoin College and was taking an additional three months' course at M.I.T."

"I left Technology in August. I was fortunate enough to get a couple of months' temporary duty on an old destroyer, and during that time was at sea in several parts of Alaska, including the Aleutians and the Andreanof Islands, about which you have possibly read in the news."

"Since then I have been living in San Francisco, going to the ship's office every day, and hoping that something would happen. Life, however, has become like Grand Hotel: 'People come and people go, but nothing ever happens.'"

"I went to a meeting of the M.I.T. Club of Northern California. I guess most of the fellows are not around any more. The meeting was pleasant but not too exciting."

We have also heard from Al Reinhardt, who has left Boston for still more defense work in the New York City region. Al writes as follows: "There is a tragic loss to report. Arthur Dzendolet, II, was killed in the disastrous Coconut Grove fire in Boston. Zing left Technology after the end of his sophomore year and joined the United States Naval Reserve as an aviation cadet. He completed his training period and then returned to Technology in 1939 to finish his work for a degree. I had the surprise of finding him enrolled in a course which I taught at Technology during the summer of 1940, and hence we renewed and extended the friendship we had formed earlier. Arthur was recalled by the Navy before he could complete his academic work, and at the time of his death was in charge of a flying school unit for Uncle Sam. I wish to pay tribute here to his truly admirable capacity for being a 'regular guy.' Kerry Arabian, do you remember Zing's discourses on Kant?"

"Charlie Cardani, VI, after a somewhat varied career as an engineer with Delco Products Corporation and as a tool designer par excellence with Bendix Radio in Baltimore, finds himself a lieutenant

in the Naval Reserve. From the reports I have heard, his talents will be sorely missed at Bendix. Good luck, Charlie."

"I wish to take issue with the powers of the Alumni Council for requesting information only from those who are in the armed forces and in civilian defense work. How about those of us who are engaged in extremely vital war production and who by virtue of a frequent 60-hour week (or more) find it impossible to give time to anything else but our job? Don't we, indeed, fit into the contributory picture? If there is to be a listing of Technology men 'in the war,' by all means include those who are putting their technical knowledge to the best use at home. I'm sure there are many of us who require no small amount of mental girding to prevent us from joining up, and who don't consider II-B deferments as a nice easy way out. Then, too, who else but those who have had the proper highly technicalized training can produce the intricate devices of war required by those in the fighting forces?"

"In July, I left the employ of Jackson and Moreland in Boston, and I have since concerned myself with problems in dynamics and mechanical design with the Sperry Gyroscope Company in its Garden City, N.Y., research laboratories. There are a great number of Tech men with Sperry, but, if I am not mistaken, I am the only '37 man in its fold. For one who spent four graduate years at M.I.T. studying fluid mechanics and thermodynamics, I should like to add that getting into rapport with rigid body mechanics required many extracurricular hours of the 8.01 variety. — Like all occasional contributors, I wish to add that if any others can, under the duress of matters more importune, pen a missive, it will be as much appreciated as this is to them."

Most of the chaps who have contributed to the Alumni Fund in previous years have been able to come through again this year, but there are still a few who have not done so. Our Class has done reasonably well by Technology, but this is another appeal for those of you who are former contributors and have not yet given your check, and for classmates who have not contributed before, to come through for the 1942-1943 Alumni Fund. — WINTHROP A. JOHNS, *General Secretary*, Route 1, Bellemead, N.J. PHILIP H. PETERS, *Assistant Secretary*, 10 Babson Park Avenue, Wellesley Hills, Mass.

1938

News from St. Louis brings us the story that Louis DuBois was married early in December. The bride is the former Natalie Foreshaw. Livingston Smith of Richmond, Va., Providence, R.I., and other notorious spots is now engaged to Del Williams, who attended Westhampton College. — Claude Parish has recently become engaged to Evelyn Robinson of Evanston, Ill., and Wellesley College. Lieutenant Parish is now a student at Camp Davis, N.C.

Mr. and Mrs. Dave Beaman of Winchester are now living in Durham, N.C. They

have a baby girl. Dave is doing engineering research at Duke University. — A note from Fred Lamb says: "I have swapped duties, so that I am no longer a flight instructor. I am proud to relate that I wound up almost two years of instruction and never lost a student — the M.I.T. background of scientific method, no doubt." Good luck, Fred.

Fred Boland has been promoted to the rank of captain in the Quartermaster Corps at Camp Lee, Va. Fred is an instructor of sustenance. We don't quite know what this means, but since he's a bacteriologist, I guess we can hazard a guess. Also from Camp Lee, we have news that Ernst Stolper is a cadet at the quartermaster school. Ernst was a chemist with a large dairy concern before enlisting last spring. He will be commissioned shortly. — R. E. Strickland, a lieutenant — pardon us, it is now Captain Strickland — was first assistant engineer on the Courtland Air Base job. He is now overseas doing similar work in England. — DALE F. MORGAN, *General Secretary*, 142 Woodland Avenue, New Rochelle, N.Y. RICHARD MUTHER, *Assistant Secretary*, Room 1-180, M.I.T., Cambridge, Mass.

1940

A letter from Dave Hoisington brings news that a seven-pound boy, Charles Manders Hoisington, arrived on November 9 and is slated for the Class of '63. Dave also pointed out that a recent Associated Press dispatch told of a fortress over Buna piloted by Jay Zeamer. The story mentioned that the plane's crew shot down at least two of the nine Jap fighters they met. From the same source we learned that Dick Eberle is now working with the Edward G. Budd Manufacturing Company in Philadelphia.

Tom Creamer writes that Bill Morrison dropped in at the Institute for a few minutes. Bill is in charge of a large machine shop in Milwaukee. He is doing engineering and administrative work. Bob Church was also in Cambridge recently. He is very busy working at the Bethlehem Steel Corporation's Fore River shipyard. Chappie Halstead is with the Navy in Texas and has been recently promoted to the rank of lieutenant, junior grade. According to Tom, Jim Shipman is back at the Institute working on chemical engineering research.

Al Thewlis is in the Navy and is stationed at the Electric Boat Company plant in Groton, Conn. Argir Kondos is working as a naval architect with the Atlantic Basin Iron Works in Brooklyn, N.Y. — Ray Keyes went to work with Kaiser Company, Inc., after leaving school and has been moved to the Richmond No. 3 yard here in California. Ray says there isn't much time for gymnastics, although he has done some exhibitions with the nationally famous Swiss Turnverein of Union City, N.J. — Alvin Guttag speaks of having bumped into Dave Morgenthaler in downtown Richmond early in November. He also writes that Larry Teich was on Bataan at the time it was taken and is now officially reported as missing.

1940 Continued

Janet Elizabeth Marquis became the bride of Ernest T. Gregory, Jr., on December 19; Anita Jackson was wed to Lloyd W. Nash on November 28; and Caroline Wood and Henry Earl Singleton were married recently. — Mr. and Mrs. William Kather announce the birth of Joan Carol Kather on October 10; and Barbara Joan Rainard was born on October 14 to Mr. and Mrs. Leo Rainard. — The holiday excuses are void now, gang, so please send us a wee bit of news to write for our next column. — H. GARRETT WRIGHT, *General Secretary*, 1124 Greenwich Street, San Francisco, Calif. THOMAS F. CREAMER, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1941

The war is bringing out ever more strongly the need for well-developed bodies as well as well-trained minds. There was a time back at the Institute when one could say that he did not care to participate in athletics, that he had a perpetual quiz for which to study. The boys do not say that any more when they have to run through the obstacle courses which the various service units have set up. We can see one right now when we glance out of the window. What is all this leading up to? It is simple enough; the time has come again to dig down in that back pocket and come through with a neat bonus for the well-worn Alumni Athletic Fund. The boys back at school are having an even harder time keeping fit — with all the new buildings taking up gym and field space. It is up to us to stand behind them and make sure that lack of funds does not add to the tension which is brought to bear on the present Institute students. Address your checks, earmarked for the fund, to the Advisory Council on Athletics, Room 3-219, M.I.T., and you'll have added something to the victory which we are going to attain.

And while we are on this victory business, we assume that it is all right to quote the nation's newspapers which praise Bob (the tall one) Blake for his excellent leadership over troops landing in North Africa. Bob, by the way, has been advanced to the rank of captain as a result of his swell work. By gosh if I don't think that it was Bob who, upon wishing us "so long" after school let out, said, "See you in Africa." — A double bar has come to our ex-roommate, Mert Richardson. Mert and wife, Lin, are still at the quartermaster school at Camp Lee, where the captain is an instructor. Howie Samuels, another captain, is known to be in the same vicinity.

The flashy Army War Show, which, by the way, just hit New Orleans a few weeks ago, has in its company one Bill McKenney, now a proud father. Bill, a lieutenant, left Camp Lee a short while ago. We didn't hear about the show, however, until after it had passed through the Crescent City. — There was a swell picture of Bill Folberth and the former Jean Schilling of Wellesley in the Boston *Herald* recently. The ceremony in the chapel at Wellesley must have been beautiful, and we wish our Class Agent and

his bride the best of luck. Lieutenant Folberth broke into the Army uniform last year.

We always wondered why the Sunday feature stories in the Boston newspapers never included any of our friends. In a recent copy whom should we see completely exposed to the public eye but Bill Schubert, an Army lieutenant, and his Wellesley bride Ruth, and for no other reason than that of living in a government project close to his station. There was even a picture of Schubert wiping dishes with the little lady. That is not to be forgotten in case the henpeck situation comes up at future class reunions.

Four more have joined the long list of '41 men who have given in to the fair sex. We have just mentioned Bill Folberth. John Porter's bride is the former Vera Rogers. Evelyn Woodworth and Al Leonard were married last fall. Barbara Lord became the bride of Jim Scofield, who is a research engineer for an aircraft concern in Pennsylvania. Al Leonard, by the by, is in the Air Corps Reserve.

Diving into another pile of papers, we dug out the following information on the matrimonial front: James Jump and Dion Lasher were married last fall. Jim is a distribution engineer for the Crocker-Wheeler Electric Manufacturing Company in Ampere, N.J. Luke Hayden's engagement to Dorothy Karb has been announced. Luke is with the Federal Shipbuilding and Dry Dock Company. George Farnell of the Ordnance Department of the Navy was married last fall to Ruth Morgan; and Walt Kreske, an Army lieutenant, married Elizabeth Bottomly. Lloyd Perper, also a lieutenant, took Marian Bowman as his bride near his station at Dayton, Ohio. Another Bowman in the news was Joe Bowman, wed recently to Dorothea Reid. Charlotte Walker became an Institute wife in joining hands with Wallace Blanchard last fall. That dapper Course XV fellow Stan Tirrell has surrendered, too — Helen Kennedy was the girl. It must have been a Technology reunion, with Bob Demartini as best man and Carl Mueller and Ray Foster as ushers. Congratulations are due that 100-yard-man Jack Lyons in his recent marriage to Rita Doucette, even though the event took place last August. With all sincerity, we offer best wishes to all.

We've mentioned Pierre Hartshorne's press acclaim for promotion to the rank of first lieutenant and for rescue work in a recent sinking. Work like that deserves a second mention, we believe. We have releases on Frank Amsler, who has been transferred to the naval aviation base at Squantum for training, and of Art Fletcher, a captain in the Air Corps, who has been participating in the bombing of Japanese bases in the South Pacific, according to dispatches from General MacArthur's headquarters. Cap Adelson, a first lieutenant, is going through training school at Randolph Field. — STANLEY BACKER, *General Secretary*, 46 Bicknell Street, Dorchester, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, Room 12-184, M.I.T., Cambridge, Mass.

1942

From the wilds of Camp Crowder, out where Missouri almost becomes Arkansas, Kansas, and Oklahoma all at once, your Secretary finds himself wrapped in mazes of switchboards, pole lines, fox-holes, rifles, and "usual camp duties," far from the rest of the M.I.T. Signal Corps men of '42, although several hundred of them could be here for all I'd ever have been able to find out. One of Uncle Sam's newer Army training centers, Camp Crowder is quite a phenomenon. Thousands of men and umpty-ump units go their own way here, in all stages of all types of training. There are woods, water, wild life, and back roads here to simulate almost every kind of working conditions, and the Army is very good at trying everyone out on the toughest of them. Not satisfied with roller-coaster hills, natural fords (we practically lost a '42 Chevrolet in one of them), and just naturally rugged country, the Army has built some obstacle courses here at Camp Crowder that look like all obstacles and no course. Strangely enough for a Signal Corps fort, Camp Crowder holds one of the finest records of any post in the country for firing — rifle, sub-machine gun, and so on. Service clubs, the officers' club, and the many theaters and post exchanges are very alert here, and they find a heartening response. Benny Goodman was here last fall, but the best part of his show was the jam session afterward, when enlisted men "filled in," and the Goodman group watched. At every corner there is phenomenal talent, which is uncovered very slowly sometimes. There are Swiss watchmakers, jugglers-on-monocycles, and many others.

The *Camp Crowder Message*, the post oracle, is as lively a bit of journalism as can be found anywhere, and many of you have probably heard the radio shows aired by Crowder talent from the camp grounds. For anyone who saw Army camps in peacetime, it is impossible to conceive of an establishment like this. There has been plenty of room to plan and arrange everything, and some of the finest barracks in the country, I believe, have sprouted like wet navy beans over this area that was once decked with the checkerboard of tilled farms. Would that all our city planners had used the same foresight! There is everything here that one finds in a small city, and much more than one finds in most of the towns near here. Why, shortly there will even be WAAC's quartered here on the post!

Camp Crowder is, of course, not New York City, nor is southwestern Missouri a beehive of activity, but as far as a real, honest-to-G.I. Army camp goes, I'd like to see the country dotted with Camp Crowders. The life isn't too hard, but it's the Army, and, I think, deep down inside, we all like it better that way and sometimes wish things were a little tougher even. They will be soon enough, however, even for us who wait impatiently.

I hope you'll pardon this blast of egotism, but here is its purpose: We want to know just what some of you are doing

1942 Continued

and what it's like. (And censor it before Uncle Sam does, please.) In other words, we like to get letters telling what you know about all the gang, but how's about slipping in a word about yourself now and then? How does it out your way? How does it out his way? Let's have the whole story. We can even swallow a little fiction without much discomfort. Come on, Mr. Milquetoast, shake yourself out of that tortoise shell.

It seems to me that in the Alumni Fund the Class of 1942 doesn't carry the percentage "it oughta." It's nice to believe that we are all sinking so much in war bonds that we can't use the money that would have gone for the third dish of pie à la mode. I can appreciate that two can't live as cheaply as one (especially in the courting stage, where statistics still place most of us), but somehow I think a look at my checkbook (even) would indicate that somehow maybe a few words and numbers in the right places might make things a little easier and nicer someday at M.I.T. How about that, Karl? Anyway, we ought to do our share. After all, with plutocrats like Ben Skinner, who even got a *raise*, on the loose, something ought to be done to prevent inflation.

Well, with all this black and white and no alumni news, it would seem that a premium of some sort is in order. Turning once again to the armed forces, we find '42 Army lieutenants can be addressed as follows: Bernie Driscoll at Lawrence, Mass., and John Jorgensen at Beverly, Mass. Burt Rockwell is with the Corps of Engineers somewhere overseas. Jim Kirby and his frau are at Bainbridge, Ga., where he is an instructor at a basic flying school. Jack Arend is still covering air fields at a great rate, temporarily being at Tallahassee, Fla.; Albert Mall is at the Army air base in Dover, Del.; Bill Schoen is at Sheppard Field, Texas; Charlie Ricker is in Santa Ana, Calif.; and Arie Van Teylingen finds the University Club of St. Paul, Minn., his home for the present. Private Bill Seaton is with an Air Forces training detachment in Newark, N.J.

The boys in blue are more elusive by nature. We have heard the following, however, about some '42 ensigns: Dick Small can be addressed care of Mrs. Nancy B. Small, Hotel Kenmore, Boston, Mass.; and J. Hank Henderson and wife may be written to, perhaps even found, at 726 North Nelson Street, Arlington, Va. As for the rest of the Washington group, Hank probably knows better than this column. H. G. Elrod is at 239 Prince George Street, Annapolis, and Maurie Taylor is doing a bit of research work in the Bureau of Ships of the Navy Department in Washington.

So soon must come a note of tragedy into this column. Oddly enough, this sad news does not come from across the sea but from Boston itself — from the ghastly fire on November 28 at the Cocoanut Grove, which trapped some 500 people in the flames and smoke. One of the blows close to us was the death of Arthur Dzen-dolet, an Army lieutenant. — From Maryland comes word that Cutler Jones

died at the National Naval Medical Center on Thanksgiving Day, November 26. Ensign Jones was buried with full naval honors.

In and near Boston can be found many classmates, of which those mentioned here are a few. Arthur Knudsen, Bob Katz, Leopold Michel, and John Markell are listed on the M.I.T. staff. Richard Lovelace, Sezai Cankut, Arthur Graham, Bob Jacobson, and many others are keeping the Graduate House alive these days. Cyrus Wood and Herman Feshbach are living in Cambridge; Earle Foote is at 326 Commonwealth Avenue, Boston; John Iams at 97 Bay State Road, Boston; and David Nicholson at 1569 Beacon Street, Brookline. Bud Reed, a lieutenant, is at 255 St. Paul Street, Brookline; Lucien Vianey, also on the M.I.T. staff, is living at Centre Street, Dover, Mass. In Charleston, W. Va., can be found John C. Collins, at 1572 Virginia Street, and at "The Cliffdwellers," 1017 Stadium Place, are Harry Knox, Dan Hulett, and group. Bob Fabacher is in Metairie, La.; Stephen Stephanou is with the Hercules Powder Company in Radford, Va.; and John Mingos is with E. B. Badger and Sons, Boston. From Charlie Cresap comes word that Steve Farrington can be located at 834 Berkeley Avenue, Trenton, N.J.

From far-off Alaska comes word from Bob Crosby, a lieutenant: "My copy of The Review finally reached me up here in the North. I was very glad to find out where most of the members of that great Class of '42 are now. [Secretary's note: Hear that, gang? I told you so.] However, I'd like to know just where my old friend Olie Johnson is located. I heard à la grapevine that he's one of Sammie's boys now, but I don't know the camp."

"This is wonderful country up here, except for the fact that there are no women around, and beer is something you get back in the States. However, I highly recommend bear meat à la eskimo. An officer who reported to the post a few weeks ago said he met a Tech man at a station where he stopped, but he forgot the name. We thought it might be Gus Augusterfer. If any of the boys happen to get sent out here, put it in The Review, and I'll invite them over for a party of whale oil and blubber. How are the Novars doing this year?"

From Bob Imsande, a lieutenant at the post billeting office of Camp Edwards, Mass., comes more gossip of all the lads: "I managed to catch up with my copy of The Review the other day and was glad to hear what happened to so many of the gang. I've been moved around the country myself and have run into a few more of the '42 crowd. I'm more or less stationed at Camp Edwards as assistant post engineer. Phil Umholtz, Bill Steinwachs, and John Rogers are at the Wright Aeronautical Corporation in Cincinnati. Although I didn't see Steinwachs and Rogers, I did spend an evening with Umholtz, and he mentioned that they're all together out there. Chuck Wirsing is in Worcester, but I can't remember the name of the company. Walt Kneeland is working for a cranberry concern in Plymouth,

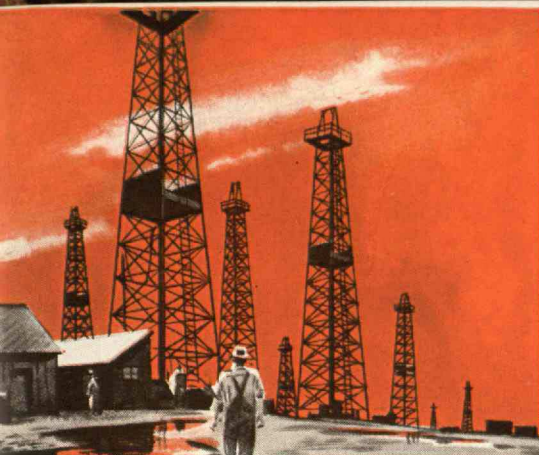
and Frank Conant is an ensign. Bill Devine and I were in the same company for about a month, but we were both transferred. He's back in Plattsburg with a water-supply battalion. Steve Hazzard is a second lieutenant at Fort Belvoir."

Harold Reed, one of the Signal Corps lieutenants sent to Technology to study, has come through with a lot of information about some of the armed forces and otherwise, since he is right in the thick of M.I.T. Delta Tau Delta activities in Brookline: "Harry Helm had 14 days' traveling and leave time before reporting to Camp Davis. Dick Russell is now stationed at Watertown Arsenal. Charlie Kelley, Phil Phaneuf, Dick Russell, Bob Kraus, and Claude McCord are all first lieutenants. Ray Shrewsbury and Alex Hancock, both XIII, are at the Navy Yard in Philadelphia. Ray was in Cambridge for a week end recently. Claude McCord has been with the Air Forces in Alaska for several months. Lew Stouse is also in Alaska. Lawson Bowers was last heard from heading west for Diesel engine school in Columbus, Ohio. Bill Lynch is at Virginia Beach as an instructor at one of the Navy's schools."

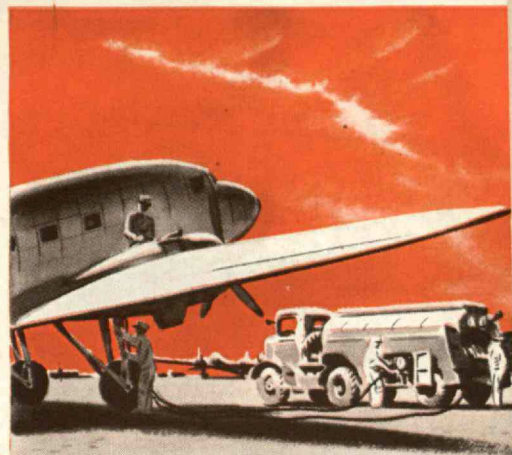
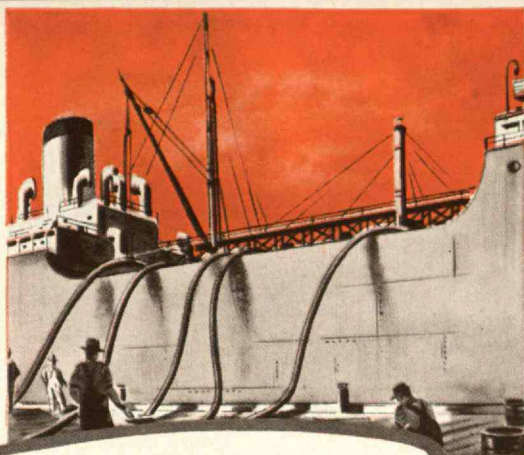
"What is Crowder like? I've heard only the best of reports about it, but, as I've never been that far west, I'm curious. What did you do about the lack of summer camp? [Answer: I spent six of the 13 weeks at company officers' school at Fort Monmouth as a cadet, along with a group of some 30 others from technical schools. That amounted to a refresher course and an introduction to the work I'll be doing, perhaps, with the company I'm assigned to here at Camp Crowder. Dick Gibson, Charlie Raynsford, Joe Osgood, and Dave Baltimore were in the first half of this course and then took the rest of their introductory work elsewhere. As far as I know, I'm the only one of our group who is assigned and trained for telephone work.] Someone told me that he saw Jack Quinn at Fort Monmouth. What have you heard about him? [Answer: The last rumor had it that Jack was in and around Red Bank, N.J., when not with the Ferry Command.]

"I'm taking an Engineering Science and Management War Training Course here, supervised by M.I.T. With seven months of studying to put in, I'm getting stuck here in Boston for eight months because some bug got hold of me. I must say that school is not too welcome after the past four years. [Note: Wait till you try teaching classes in the daytime and going to classes at night.]

"I have another note to add: Pete Hellige married Betty Armstrong a few months ago. [Note: Tsk, tsk, Mr. Hellige, such secrecy, modesty, or stuff.] — You'll probably be too busy to answer this direct, so let's hear about Crowder in the notes. How about giving the Navy a glowing account of an Army post? I recently saw the naval air station at Quonset Point, and it was very impressive." — FREDERICK W. BAUMANN, JR., General Secretary, Orchard Lane, Golf, Ill. KARL E. WENK, JR., Assistant Secretary, The Graduate House, M.I.T., Cambridge, Mass.



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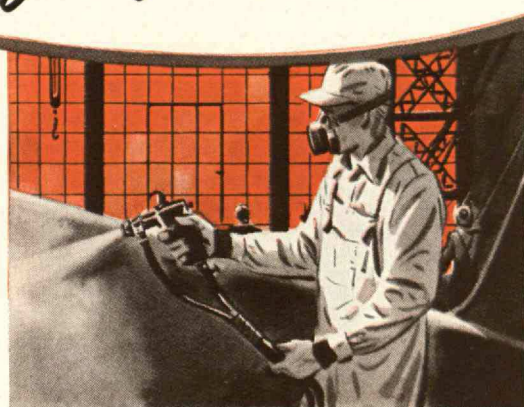


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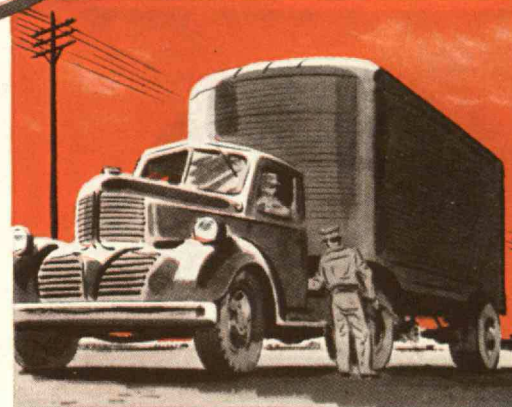
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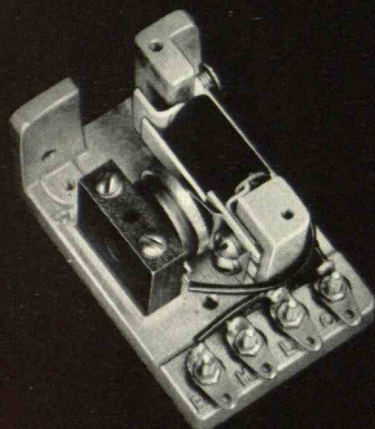
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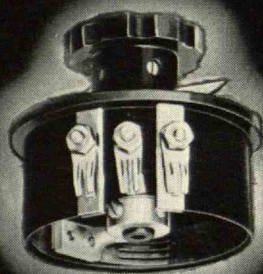
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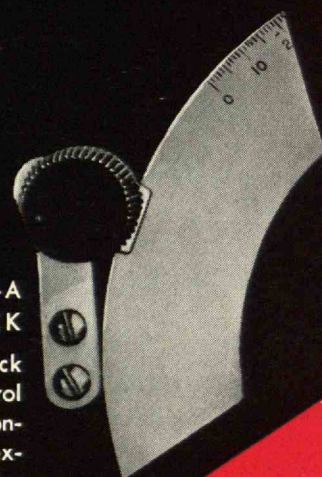


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